FILE COPY

NOV 13 2018

Harry Kim
Mayor

Wilfred M. Okabe
Managing Director

William A. Kucharski
Director

Diane A. Noda
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

345 Kekūanāo'a Street, Suite 41 • Hilo, Hawai'i 96720
(808) 961-8083 · Fax (808) 961-8086
http://www.hawaiicounty.gov/environmental-management/

October 26, 2018

Scott Glenn, Director
Office of Environmental Quality Control State of Hawai'i
235 South Beretania Street, Room 702
Honolulu, Hawai'i 96813

Subject: Draft Environmental Assessment/ Anticipated Finding of No Significant Impact Notice (Joint NEPA/HEPA)
Pahala Community Large Capacity Cesspool Replacement Project
Pa'au'au, Ka'u, Hawai'i Island, Hawai'i
Tax Map Key (TMK): (3) 9-6-002:018
Republished Draft EA

Dear Mr. Glenn:

The U.S. Environmental Protection Agency and the Hawai'i County Department of Environmental Management are requesting a republication of the joint Draft Environmental Assessment (DEA) of the Proposed Pahala Large Capacity Cesspool Replacement Project to extend the public comment period until December 10, 2018.

There have been no changes, additions or modifications to the DEA document which was previously published in the September 23, 2018 Environmental Notice.

The required information and documents will be submitted by Earl Matsukawa, Wilson Okamoto Corporation, our consultant. Please call him with any questions at 808.946.2277 or Dora Beck, County of Hawai'i, Wastewater Division Chief at 808.961.8513.

RECEIVED
'18 OCT 26 P1:16
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Sincerely,

Diane A. Noda
for William A. Kucharski
Director

WK: dan
Enclosure

cc: K. Rao, EPA Region 9
E. Matsukawa, Wilson Okamoto Corporation
C. Lekven, Brown and Caldwell

County of Hawai'i is an Equal Opportunity Provider and Employer.

19-134

AGENCY
PUBLICATION FORM

Project Name:	Pāhala Community Large Capacity Cesspool Replacement Project
Project Short Name:	Pāhala Large Capacity Cesspool Replacement
HRS §343-5 Trigger(s):	Use of State and County lands and funds
NEPA Trigger	Use of congressional earmark funds
Island(s):	Hawai'i
Judicial District(s):	Ka'u
TMK(s):	9-6-002:018
Permit(s)/Approval(s):	State of Hawai'i Department of Health - Approval to Construct, Approval to Use, National Pollutant Discharge Elimination System (NPDES) Permit, Underground Injection Well Abandonment, Noise Variance (if required) County of Hawai'i - Special Permit, Plan Approval, Grading Permit, Building Permit, Fence Permit, Street Usage Permit
Proposing/Determining Agencies:	County of Hawai'i Department of Environmental Management / U.S. Environmental Protection Agency, Region 9
Contact Name, Email, Telephone, Address	Dora Beck, 345 Kekūanāo'a St., Suite 41, Hilo, HI 96720 Dora.Beck@hawaiicounty.gov (808) 961-8083
Accepting Authority:	(for EIS submittals only)
Contact Name, Email, Telephone, Address	
Consultant:	Wilson Okamoto (COH) / Eastern Research Group, Inc (EPA)
Contact Name, Email, Telephone, Address	Earl Matsukawa, AICP 1907 S. Beretania Street, Suite 400 Honolulu, HI 96826 PahalaEA@wilsonokamoto.com tel: (808) 946-2277 / fax: (808) 946-2253

Status (select one)	**Submittal Requirements**
____ DEA-AFNSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the proposing agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.

19-134

FEIS Statutory Acceptance	Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency actions.
____ Supplemental EIS Determination	The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
_X_ Other	Republish DEA-AFNSI

Project Summary

Provide a description of the proposed action and purpose and need in 200 words or less.

The County of Hawai'i Department of Environmental Management proposes to construct wastewater system improvements replacing the large capacity cesspools (LCCs) currently serving Pāhala, in order to comply with U.S. Environmental Protection Agency (EPA) regulations. The project improvements would include a new wastewater collection system located primarily within public streets in the Pāhala community, and a treatment and disposal system on land to be acquired by the County (TMK: 9-6-002: 018). The project would be partially funded by an EPA grant and by the Clean Water State Revolving Fund loan program.

The collection system would consist of approximately 12,120 linear feet of 8 to 12-inch diameter underground gravity flow piping in Maile, 'Ilima, Huapala, Hīnano, Hala, Puahala and Pīkake Streets. The treatment and disposal facility would occupy about 14.9 acres and consist of a headworks and an odor control unit, an operations building, four lined aerated lagoons, a subsurface flow constructed wetland to remove nitrogen with an adjacent disinfection system to remove pathogens, and four slowrate land treatment basins for further treatment and disposal of the treated effluent. A perimeter security fence would enclose the entire facility. The existing LCCs and associated wastewater collection system would be abandoned.

DRAFT ENVIRONMENTAL ASSESSMENT
for the
Pāhala Large Capacity Cesspool (LCC)
Replacement Project
EPA Grant XP-96942401

Pāhala, District of Kaʻu, County of Hawaiʻi, Hawaiʻi

U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, California 94105

County of Hawaiʻi
25 Aupuni Street
Hilo, HI 96720

DRAFT

September 2018

THIS PAGE INTENTIONALLY LEFT BLANK

TITLE PAGE

Prepared for:

U.S. Environmental Protection Agency and the County of Hawai'i

Prepared By:

Brown & Caldwell – contractor to the County of Hawai'i
Wilson Okamoto Corporation – subcontractor to Brown & Caldwell
Eastern Research Group, Inc. (ERG) – contractor to the U.S. Environmental Protection Agency

LIST OF PREPARERS

Eastern Research Group, Inc. (ERG):

Braden Rosenberg
Patrick Goodwin
J.J. Johnson
April Eilers
Kettie Rupnik

Wilson Okamoto Corporation:

Earl Matsukawa
John Sakaguchi

Brown & Caldwell:

Craig Lekven

PREFACE

The National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. § 4321 – 4347), requires a federal agency proposing to undertake a project to consider the potential environmental impacts of the proposed project. Use of federal funds for a project is among the criteria set forth in NEPA that require preparation of environmental review documentation under NEPA and procedural requirements at 40 C.F.R. Parts 1500-1508 (Council on Environmental Quality (CEQ) regulations), and 40 CFR Part 6 (U.S. Environmental Protection Agency (EPA) regulations). The Pāhala Large Capacity Cesspool Replacement Project will be constructed with funds provided by EPA. EPA Region 9 has determined that NEPA requirements for the proposed project can be fulfilled by preparing an Environmental Assessment (EA) with an anticipated Finding of No Significant Impact (FONSI).

Comparably, Chapter 343, Hawai'i Revised Statues (HRS), as amended, and implementing rules under Hawai'i Administrative Rules (HAR) Title 11, Chapter 200 (State of Hawai'i Department of Health) require state and local governmental agencies undertaking projects utilizing state or county lands or funds to consider the potential environmental impacts of a proposed project by preparing environmental review documentation. The Pāhala Large Capacity Cesspool Replacement project will be constructed by the County of Hawai'i Department of Environmental Management (DEM) using County funds. The DEM has determined that the requirements of Chapter 343, HRS can be fulfilled by preparing an EA with an anticipated FONSI.

Federal NEPA regulations at 40 C.F.R. § 1506.2 direct federal agencies to cooperate with state and local agencies to the fullest extent possible to reduce duplication between NEPA and state and local requirements. See also 40 C.F.R. §§ 6.200 and 6.201. Hawai'i law and regulations similarly direct agencies subject to Chapter 343, HRS to cooperate with federal agencies to the fullest extent possible (HRS 343-5(h), HAR 11-200-25(2)). This EA has been prepared to jointly meet the content and procedural requirements of both NEPA and federal cross-cutting authorities, and Chapter 343, HRS, as amended.

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

ACRONYMS iii
PREFACE i
1 SUMMARY 1-1
2 PROPOSED PROJECT DESCRIPTION 2-1
2.1 Background 2-1
2.1.1 Pāhala Community 2-1
2.1.2 Project Funding 2-1
2.1.3 Large Capacity Cesspools 2-3
2.1.4 History of Wastewater Management in Pāhala 2-3
2.2 Purpose and Need for Action 2-3
2.3 Proposed Action – Site 7 Alternative (Preferred Alternative) 2-3
2.3.1 Acquire Site 7 and Construct New Secondary Wastewater Treatment and Disposal Facility 2-4
2.3.2 Construct New Wastewater Collection System 2-10
2.3.3 Close and Abandon Two Existing Large Capacity Cesspools 2-12
2.3.4 Close and Abandon Existing Wastewater Collection System 2-13
2.4 Proposed Action – Site 8 Alternative 2-13
2.5 Proposed Action – Site 9 Alternative 2-14
2.6 No-Action Alternative 2-14
2.7 Development of Site Alternatives and Selection of Preferred Alternative 2-14
2.8 Alternatives Considered but Not Carried Forward 2-19
2.8.1 Other Site Alternatives 2-19
2.8.2 Other Wastewater Treatment Alternatives 2-20
2.8.3 Other Effluent Management Options 2-22
2.9 Relationship to 2007 Final Environmental Assessment 2-22
2.10 Other Considerations 2-23
2.10.1 Zoning Considerations 2-23
2.10.2 Land Transfer 2-23
2.10.3 Hawai'i Revised Statutes (HRS) Chapter §205 Considerations 2-24
3 DESCRIPTION OF EXISTING CONDITIONS, IMPACTS AND MITIGATION MEASURES 3-1
3.1 Climate 3-1
3.1.1 Existing Conditions 3-1
3.1.2 Impacts and Mitigation Measures 3-1
3.2 Topography 3-2
3.2.1 Existing Conditions 3-2
3.2.2 Impacts and Mitigation Measures 3-3
3.3 Geology 3-4
3.3.1 Existing Conditions 3-4
3.3.2 Impacts and Mitigation Measures 3-4

3.4 Seismic Hazard 3-4
3.4.1 Existing Conditions 3-4
3.4.2 Impacts and Mitigation Measures 3-5
3.5 Volcanic Hazard 3-5
3.5.1 Existing Conditions 3-5
3.5.2 Impacts and Mitigation Measures 3-6
3.6 Soils 3-6
3.6.1 Existing Conditions 3-6
3.6.2 Impacts and Mitigation Measures 3-8
3.7 Surface Water 3-8
3.7.1 Existing Conditions 3-8
3.7.2 Impacts and Mitigation Measures – Construction Activities 3-9
3.7.3 Impacts and Mitigation Measures – Operation of Wastewater System 3-10
3.8 Ground Water 3-11
3.8.1 Existing Conditions 3-11
3.8.2 Impacts and Mitigation Measures 3-12
3.9 Flood Risk 3-13
3.9.1 Existing Conditions 3-13
3.9.2 Impacts and Mitigation Measures 3-13
3.10 Agricultural Lands 3-14
3.10.1 Existing Conditions 3-14
3.10.2 Impacts and Mitigation Measures 3-17
3.11 Solid and Hazardous Waste 3-18
3.11.1 Existing Conditions 3-18
3.11.2 Impacts and Mitigation Measures 3-18
3.12 Flora 3-19
3.12.1 Existing Conditions 3-19
3.12.2 Impacts and Mitigation Measures 3-20
3.13 Fauna 3-20
3.13.1 Existing Conditions 3-20
3.13.2 Impacts and Mitigation Measures 3-21
3.14 Air Quality 3-22
3.14.1 Existing Conditions 3-22
3.14.2 Impacts and Mitigation Measures 3-23
3.15 Archaeological and Cultural Resources 3-24
3.15.1 Existing Conditions 3-24
3.15.2 Impacts and Mitigation Measures 3-25
3.16 Socioeconomic Characteristics 3-26
3.16.1 Existing Conditions 3-26
3.16.2 Impacts and Mitigation Measures 3-28
3.17 Traffic 3-28

3.17.1 Existing Conditions 3-28
3.17.2 Impacts and Mitigation Measures 3-29
3.18 Noise 3-30
3.18.1 Existing Conditions 3-30
3.18.2 Impacts and Mitigation Measures 3-31
3.19 Visual Considerations and Light Pollution 3-31
3.19.1 Existing Conditions 3-31
3.19.2 Impacts and Mitigation Measures 3-32
3.20 Public Services – Police Protection 3-33
3.20.1 Existing Conditions 3-33
3.20.2 Impacts and Mitigation Measures 3-33
3.21 Public Services – Fire Protection 3-33
3.21.1 Existing Conditions 3-33
3.21.2 Impacts and Mitigation Measures 3-33
3.22 Infrastructure – Water System 3-34
3.22.1 Existing Conditions 3-34
3.22.2 Impacts and Mitigation Measures 3-34
3.23 Infrastructure – Drainage System 3-35
3.23.1 Existing Conditions 3-35
3.23.2 Impacts and Mitigation Measures 3-35
3.24 Infrastructure – Electrical and Communications Systems 3-35
3.24.1 Existing Conditions 3-35
3.24.2 Impacts and Mitigation Measures 3-36
4 CUMULATIVE EFFECTS 4-1
4.1 Scope of Analysis 4-1
4.1.1 Past, Present, and Reasonably Foreseeable Actions 4-1
4.1.2 Actions Considered but Excluded from Analysis 4-1
4.2 Cumulative Improvements and Impacts Analysis 4-2
5 FEDERAL CROSS CUTTER REQUIREMENTS 5-1
5.1 Archaeological and Historic Preservation Act (54 U.S.C. § 312502) 5-1
5.2 Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668c) 5-2
5.3 Clean Air Act (42 U.S.C. § 7401) 5-2
5.4 Coastal Barrier Resources Act (U.S.C. §3501) 5-2
5.5 Coastal Zone Management Act (16 U.S.C. §1451) 5-3
5.6 Endangered Species Act (16 U.S.C. §1531) 5-7
5.7 Environmental Justice Executive Order 12898 5-8
5.8 Farmland Protection Policy Act (7 U.S.C. §4201) 5-9
5.9 Fish and Wildlife Coordination Act (16 U.S.C §661) 5-9
5.10 Floodplain Management (Executive Order 19888, as amended by Executive Orders 1248 and 13690) 5-10
5.11 Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C.

§1801 5-10
5.12 Marine Mammal Protection Act (16 U.S.C. §§ 703 *et seq.*) 5-11
5.13 Migratory Bird Treaty Act (16 U.S.C. §§ 703 *et seq.*) 5-11
5.14 National Historic Preservation Act (U.S.C. 54 §300101) 5-11
5.15 Protection of Wetlands (Executive Order 11990 (1977), as amended by Executive Order 12608 (1997)) 5-12
5.16 Rivers and Harbors Act (33 U.S.C. § 403) 5-12
5.17 Safe Drinking Water Act (42 U.S.C. §300f) 5-13
5.18 Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) 5-13
6 PLANS, POLICIES AND CONTROLS 6-1
6.1 State Land Use Plans and Policies 6-1
6.1.1 Hawai'i State Plan 6-1
6.1.2 State Functional Plans 6-4
6.1.3 State Land Use District 6-5
6.1.4 Chapter 344, State Environmental Policy 6-6
6.1.5 Hawai'i Coastal Zone Management Program 6-6
6.2 Hawai'i County Land Use Plans and Policies 6-11
6.2.1 Hawai'i County General Plan 6-11
6.2.2 Ka'ū Community Development Plan 6-14
6.2.3 County of Hawai'i Zoning 6-19
6.2.4 County of Hawai'i Special Management Area 6-19
7 PUBLIC PARTICIPATION 7-1
8 FINDINGS AND DETERMINATION 8-1
8.1 Chapter 343, Hawai'i Revised Statutes (HRS) – Department of Environmental Management (DEM) Anticipated Finding of No Significant Impact (FONSI) 8-1
8.1.1 Significance Criteria 8-1
8.1.2 Determination 8-4
8.2 National Environmental Policy Act – EPA Preliminary Finding of No Significant Impact (FONSI) 8-4
8.2.1 Project Location and Description 8-4
8.2.2 Purpose and Need for Proposed Project 8-5
8.2.3 Environmental Consequences 8-5
9 LIST OF PERMITS AND APPROVALS 9-1
10 CONSULTED PARTIES 10-1
10.1 Pre-Assessment Consultation 10-1
10.2 Agencies and Organizations Consulted on the Draft EA 10-3
11 REFERENCES 11-1

List of Figures

Figure 2.1. Location of Pāhala Community on the Island of Hawai'i 2-2
Figure 2.2. Elements of the Proposed Action 2-5

Figure 2.3. Preliminary Site Plan for New Wastewater Treatment and Disposal Facility at Site 7 (Preferred Alternative) 2-6
Figure 2.4. Preliminary Process Schematic for New Wastewater Treatment and Disposal Facility at Site 7 (Preferred Alternative) 2-8
Figure 2.5. Example of Shade Ball Floating Cover in a Lagoon 2-9
Figure 2.6. Preliminary Collection System Plan with New Wastewater Treatment and Disposal Facility at Site 7 (Preferred Alternative) 2-11
Figure 2.7. Site 8 Alternative – Preliminary Site Plan for New Wastewater Treatment and Disposal Facility 2-15
Figure 2.8. Site 9 Alternative – Preliminary Site Plan for New Wastewater Treatment and Disposal Facility 2-16
Figure 2.9. Locations of Nine Candidate Sites Considered for New Wastewater Treatment and Disposal Facility 2-18
Figure 3.1. Pāhala Area Soils Map 3-7
Figure 3.2. Pāhala Area Land Study Bureau (LSB) Ratings Map 3-15
Figure 3.3. Pāhala Area Agricultural Lands of Importance to the State of Hawai'i (ALISH) Classification Map 3-16
Figure 6.1. Community Development Plan Land Use Policy Map 6-17

List of Tables

Table 3.1. Demographic, Economic and Social Characteristics of Pāhala and Hawai'i County 3-27
Table 3.2. Permissible Sound Levels by Zoning District 3-30
Table 6.1. Hawai'i State Plan Objectives and Policies 6-1

Appendices

APPENDIX A. Responses to Pre-Assessment Consultation Letters

APPENDIX B. June 2018 Preliminary Engineering Report (PER)

APPENDIX C. August 2018 Biological Survey Report

ACRONYMS

AAQS	Ambient air quality standards
AC	Asphaltic concrete
ACS	American Community Survey
AHPA	Archaeological and Historic Preservation Act
AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to the State of Hawai'i
AOC	Administrative Order on Consent
ASTM	American Society for Testing and Materials
BMP	Best management practice
BOD_5	Five-day biochemical oxygen demand
CAA	Clean Air Act
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CEQ	Council on Environmental Quality
COE	(United States Army) Corps of Engineers
CWRM	Commission on Water Resource Management
CWSRF	Clean Water State Revolving Fund
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dBA	A-weighted decibel scale
DBEDT	(State of Hawai'i) Department of Business, Economic Development and Tourism
DEM	(County of Hawai'i) Department of Environmental Management
DLNR	(State of Hawai'i) Department of Land and Natural Resources
DOH	(State of Hawai'i) Department of Health
DWS	(County of Hawai'i) Department of Water Supply
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
EPA	(United States) Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FWS	(United States) Fish and Wildlife Service
GAC	Granular activated carbon
HAR	Hawai'i Administrative Rules
HCC	Hawai'i County Code
HDPE	High-density polyethylene

HELCO	Hawai'i Electric and Light Company
HRS	Hawai'i Revised Statues
IBC	International Building Code
LCC	Large capacity cesspool
LF	Linear feet
LSB	(University of Hawai'i) Land Study Bureau
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
msl	Mean sea level
NAAQS	National ambient air quality standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLAA	Not likely to adversely affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OEQC	(State of Hawai'i) Office of Environmental Quality Control
OSHA	Occupational Safety and Health Administration
PER	Preliminary Engineering Report
PM	Particulate matter
PVC	Polyvinyl chloride
REC	Recognized environmental concern
ROW	Right-of-way
SDWA	Safe Drinking Water Act
SF	Square feet
SHPD	(Hawai'i) State Historic Preservation Division
SIP	State Implementation Plan
SMA	Special Management Area
SO_2	Sulfur dioxide
SUP	Special Use Permit
SWPPP	Stormwater Pollution Prevention Plan
TMK	Tax Map Key
TSS	Total suspended solids
U.S.C.	United States Code
UIC	Underground Injection Control
USGS	United States Geological Survey

1 SUMMARY

Proposing County Agency:	County of Hawai'i Department of Environmental Management 345 Kekūanāo'a Street, Suite 41 Hilo, HI 96720
Proposing Federal Agency:	U.S. Environmental Protection Agency, Region 9 75 Hawthorne Street San Francisco, CA 94131
EA Preparers:	Wilson Okamoto Corporation 1907 South Beretania Street, Suite 400 Honolulu, HI 96826 Contact: Earl Matsukawa, AICP, Project Manager Tel: 808.946.2277; Fax: 808.946.2253 Eastern Research Group, Inc. (ERG) 14555 Avion Parkway, Suite 200 Chantilly, VA 20151 Contact: Braden Rosenberg, Project Manager Tel: 774.277.0503
Project Location:	Pāhala, Hawai'i
Recorded Fee Owner:	Kamehameha Schools
Tax Map Key:	9-6-002:018
Area:	14.9 acres project site 42.5 acres parcel
State Land Use Classification:	Urban Agricultural
County Zoning:	Various residential County of Hawai'i streets AG-20 Agricultural
Proposed Action:	The proposed wastewater collection system would be located within five streets in the western portion of the community (Maile, 'Ilima, Huapala, Hīnano, and Hala Streets) and two public streets in the eastern portion of the community (Puahala and Pīkake Streets). The proposed wastewater treatment and disposal facility would occupy about 14.9 acres and would consist of a headworks and

an odor control unit, an operations building, four lined aerated lagoons, a subsurface flow constructed wetland to remove nitrogen and an adjacent disinfection system to remove pathogens and four slow-rate land treatment basins for disposal of the treated effluent.

Impacts: No significant impacts are anticipated from construction and use of the collection system and the wastewater treatment and disposal facility.

Agencies Consulted in Pre-Draft Assessment:

Federal

U.S. Army Corps of Engineers (COE)

U.S. Fish and Wildlife Service (FWS)

U.S. Department of Agriculture National Resources Conservation Service

National Oceanic and Atmospheric Administration (NOAA)

National Park Service Hawai'i Volcanoes National Park

State of Hawai'i

Department of Agriculture

Department of Accounting and General Services

Department of Business, Economic Development and Tourism (DBEDT)

- DBEDT, Hawai'i State Energy Office
- DBEDT, Land Use Commission
- DBEDT, Office of Planning

Hawai'i Emergency Management Agency

Department of Health (DOH)

- DOH, Office of Environmental Quality Control
- DOH, Office of Director
- DOH, Environmental Management Division
- DOH, Environmental Planning Office
- DOH, Clean Water Branch
- DOH, Safe Drinking Water Branch
- DOH, Wastewater Branch

Department of Land and Natural Resources (DLNR)

- Engineering Division

Division of Forestry and Wildlife
Historic Preservation Division
Commission on Water Resources Management
Department of Transportation
Department of Hawaiian Home Lands
Office of Hawaiian Affairs
University of Hawai'i, Environmental Center
Hawai'i State Library
Hilo Regional Library

County of Hawai'i

Hawai'i Fire Department
Department of Parks and Recreation
Planning Department
Police Department
Department of Public Works
Department of Water Supply

Elected Officials

Congresswoman Tulsi Gabbard
State Senator Russell Ruderman
State Representative Richard H.K. Onishi
Councilmember Maile Medeiro

Native Hawaiian Organizations

Hawai'i Island Burial Council
Association of Hawaiian Civic Clubs
Charles Pelenui Mahi 'Ohana
Friends of 'Iolani Palace
Hawaiian Civic Club of Hilo
Kamehameha Schools
Kanu o ka'Āina Learning 'Ohana
Ko'olau Foundation
Maku'u Farmers Association
Na Koa Ikaika Ka Lāhui Hawai'i

Office of Hawaiian Affairs

Pacific Agricultural Land Management Systems

Partners in Development Foundation

Pi'ihonua Hawaiian Homestead Community Association

Other

Hawai'i Gas

Hawaiian Electric Light Company

Hawaiian Telcom

Spectrum Hawai'i

Mr. Stason Nishimura

Mr. Lance Uno

Ms. Julia Neal

The comments and responses are shown in Appendix A.

2 PROPOSED PROJECT DESCRIPTION

2.1 Background

2.1.1 Pāhala Community

The community of Pāhala is located about 52 miles southwest of Hilo, in the Kaʻū District, Island of Hawaiʻi. Pāhala is located west (mauka) of Māmalahoa Highway (State Route 11) about 3.8 miles from the shoreline. Most of the community lies between 980 feet above mean sea level (msl) on the western end and approximately 800 feet above msl on the eastern end. Figure 2.1 shows the location of Pāhala.

Even though Kaʻū was one of the originally settled areas in the Hawaiian Islands, it remains a vast remote area. Only a fraction of a percent has been developed with residential properties, and the remainder is largely used for agricultural purposes or is undeveloped. The District of Kaʻū is situated at the southern tip of the island and extends across the southern and southeastern flanks of Mauna Loa. The Kaʻū District covers about 922 square miles (approximately 590,000 acres), with over 80 miles of virtually undeveloped coastline. Nearly two-thirds of its total land area is in the Conservation district. The Kaʻū district includes several communities of which the Pāhala community is the largest, with a population of approximately 1,405 persons in 2016, the most recent estimate. The distance to the communities of Hilo and Kailua-Kona means that the Kaʻū District is relatively isolated from the major infrastructure systems found in these communities, including wastewater treatment and disposal facilities.

Founded in 1826, C. Brewer and Company, Ltd. (C. Brewer) was both the oldest company in Hawaiʻi and a major developer of the sugar industry in Pāhala. The Kaʻū Sugar Company operations were closed in 1996, meaning that the sugar industry was no longer the major agricultural activity of the Kaʻū region. However, agriculture is still the major source of economic activity in the region. Today, macadamia nuts are the major crop grown within the Kaʻū District; however, growing competition from foreign producers is beginning to affect the industry.

2.1.2 Project Funding

(a) <u>EPA Special Appropriation Grant</u>

In 2006, an EPA Special Appropriation Grant was awarded to the County of Hawaiʻi for the Kaʻū Large Capacity Cesspool Replacement Project Grant (XP-96942401). The grant's federal funding amount is $1.842 million and currently expires in October 2020. The purpose of the award is for the design and construction of wastewater system improvements to replace LCCs in the Kaʻū District. The grant award and current work plan provide funding to replace the LCCs serving the Pāhala community.

(b) <u>State Revolving Fund</u>

This project may also be funded by the State of Hawaiʻi DOH Clean Water State Revolving Fund (CWSRF) Program. The CWSRF Program was created by the federal Water Quality Act of 1987 and authorizes low interest loans for the construction of publicly owned wastewater treatment works. In 1988, the Hawaiʻi State Legislature passed Act 365, now Chapter 342D, Hawaiʻi Revised Statues (HRS), to establish the State Water Pollution Control Revolving Fund to receive the federal capitalization grant. Chapter 342D [Part V.], Water Pollution Control Financing, and HRS 342D-81 set forth that the State's policy is to promote water pollution prevention and control, including the use of recycled water, by financing eligible projects consistent with applicable federal and state laws.

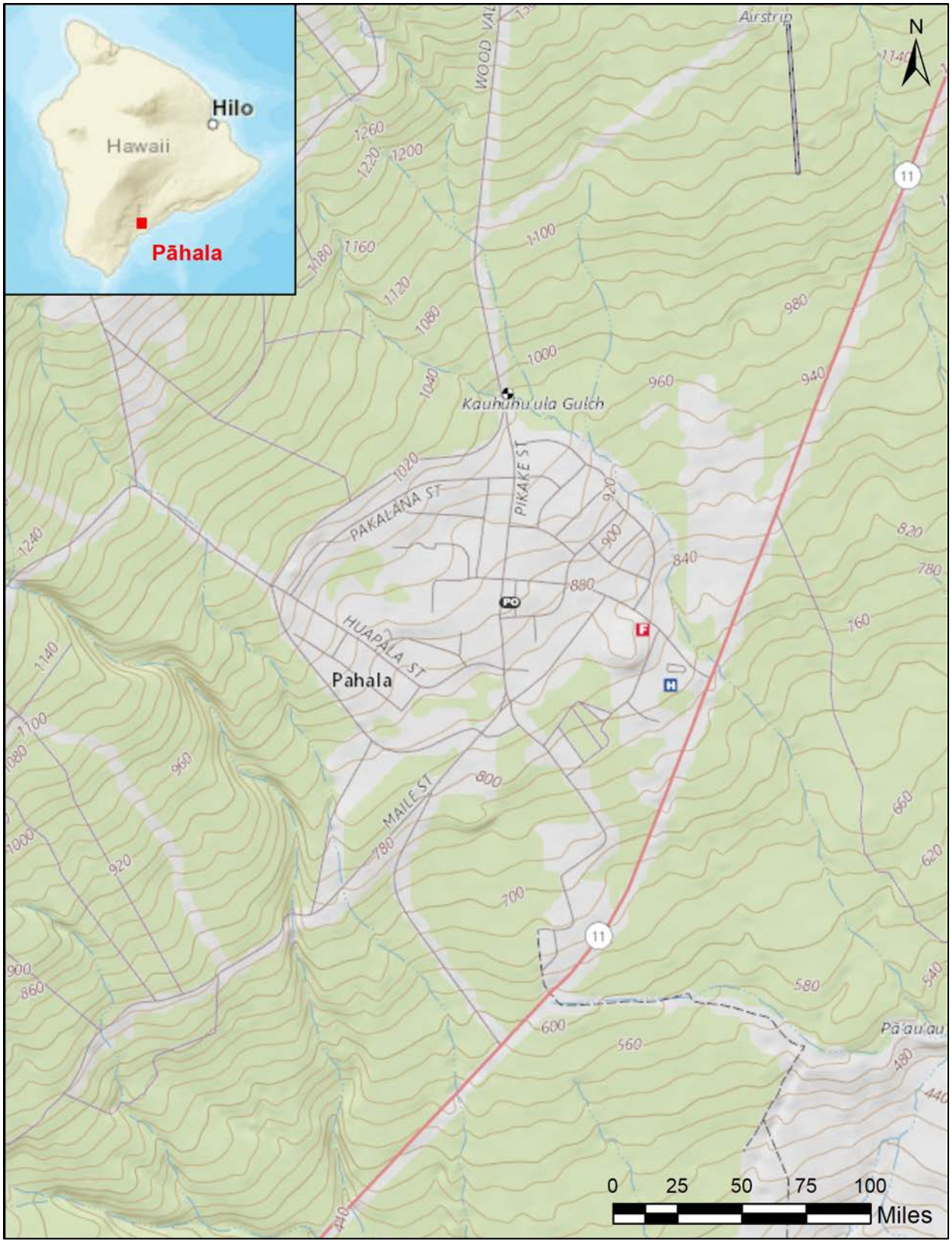


Figure 2.1. Location of Pāhala Community on the Island of Hawaiʻi

2.1.3 Large Capacity Cesspools

In 1999, EPA promulgated regulations under the Safe Drinking Water Act's Underground Injection Control (UIC) Program which prohibited the construction of new large capacity cesspools (LCCs) as of April 2000 and required the closure of all existing LCCs by April 5, 2005 (see 40 C.F.R. § 144.88). Under federal regulations, an LCC is a cesspool which serves multiple dwellings, or for non-residential facilities has the capacity to serve 20 or more persons per day. Cesspools can release disease-causing pathogens and other pollutants (e.g., nitrates) into ground water aquifers, streams, and eventually the ocean, thus leading to public health and environmental concerns.

In June 2017, EPA and the County entered into an Administrative Order on Consent (AOC) to close the LCCs serving the Pāhala Community by June 2021.

2.1.4 History of Wastewater Management in Pāhala

The Pāhala community is currently served by a sewer system comprised of substandard gravity lines that convey sewage to two LCCs serving approximately 109 parcels, which were previously owned and operated by C. Brewer. In 1996, C. Brewer shut down its sugar growing and processing facility in Pāhala. In 2003, C. Brewer requested assistance from the County to close their LCCs. Subsequently, the County held a community meeting to present sewer system replacement alternatives. Voting took place via mail for the Pāhala community to choose the preferred sewer improvement alternative resulting in 87 percent of the returned ballots in favor of the installation of a new sewer collection system and a treatment and disposal system to be operated and maintained by the County.

Around 2006, C. Brewer requested that the County construct and maintain a new and improved community sewer system. A County Council Resolution approved the C. Brewer request. In anticipation of C. Brewer's dissolution, C. Brewer proposed, and the County agreed, to enter into a formal agreement to not only construct and maintain a new and improved community sewer system but to assume ownership of the existing system including the LCC's by April 30, 2010.

2.2 Purpose and Need for Action

The purpose of the actions considered in this Environmental Assessment (EA) is to provide the infrastructure necessary to enable the County to comply with the SDWA and fulfill the compliance provisions of the AOC between EPA and the County with respect to closure of the Pāhala LCCs by June 2021.

The need for action is driven by the public health and environmental concerns associated with LCCs, as described in Section 2.1.3.

2.3 Proposed Action – Site 7 Alternative (Preferred Alternative)

This section describes the Preferred Alternative under the Proposed Action.

Under the Preferred Alternative, the County of Hawaiʻi would perform the following actions:

1) Acquire, or otherwise obtain the right to develop and use, a portion of the 42.5-acre Site 7 that is currently owned by Kamehameha Schools, then construct a new secondary wastewater treatment and disposal facility within a portion of the parcel (see Figure 2.3);
2) Construct a wastewater collection system, primarily within the public right-of-way (ROW) and two short segments within easements in the Pāhala community, to collect and convey sanitary waste from the residential lots to the new treatment and disposal facility;
3) Close and abandon two LCCs, according to DOH closure procedures; and
4) Abandon the existing wastewater collection system in place.

These actions are described in further detail below and are depicted in Figure 2.2.

2.3.1 Acquire Site 7 and Construct New Secondary Wastewater Treatment and Disposal Facility

Under the Preferred Alternative, the County would acquire, or obtain the right to develop and use, a 14.9-acre portion of the parcel identified as Site 7 for construction of a new secondary wastewater treatment and disposal facility. This 42.5-acre parcel (Tax Map Key (TMK): 9-6-002:018), located about 0.5 miles (2,600 feet) south of the developed area of the community, is owned by Kamehameha Schools and used as a macadamia nut orchard. It is located adjacent to LCC #1. An at-grade irrigation system runs in a north-south direction which allows vehicle access between the rows. Slopes throughout Site 7 are between approximately 3 and 10 percent.

The County would work with the current landowner to subdivide the 42.5-acre parcel into two parcels: 1) a 14.9-acre parcel that would be owned by the County; and 2) a 27.6-acre parcel that would include a 25-foot-wide by 1,500-foot-long utility easement and would continue to be owned by the current owner. See Figure 2.3 for a preliminary site plan showing the proposed location of the treatment and disposal facility within the southeast portion of Site 7. This location is east (makai) of an existing access road to the adjacent parcel in the northwest corner of the Maile Street and Māmalahoa Highway intersection outside of the State of Hawaiʻi Department of Transportation right-of-way. Access to the parcel would be provided from an access driveway on Maile Street sited about 200 feet east of the adjacent parcel access road and approximately 650 feet west (mauka) of the Maile Street and Māmalahoa Highway intersection.

The County developed wastewater flow projections for the treatment and disposal facility using the City and County of Honolulu current wastewater standards, most recently updated during 2017. Based on these standards, the treatment and disposal facility would be designed to provide an average dry weather flow capacity of 190,000 gallons per day, which would be sufficient capacity to allow closure of the two LCCs.

The wastewater treatment and disposal facility would consist of the following primary components:

- Headworks preliminary treatment system. The headworks would protect the downstream system operations from large objects, debris, and rags that may be present in the incoming flows. It would include a below-grade concrete tank with channels to control flows; a fiberglass or aluminum cover plate to facilitate foul air collection; an above-grade screening system; a granular activated carbon (GAC) scrubber for odor control; and influent flow measurement and sampling equipment. A free-standing roof structure over the headworks would protect operators and equipment from rain and sun conditions.
- Aerated lagoon treatment system. A series of three 0.4-acre partial-mix aerated lagoons would provide biological wastewater treatment. Partial-mix aerated lagoons allow the solids to settle while providing enough aeration and mixing to meet the oxygen demands of the naturally occurring micro-organisms in the system. The lagoons would be equipped with high-speed floating aerators and high-density polyethylene (HDPE) liners to prevent wastewater seepage into the subsurface.
- Subsurface flow constructed wetland. The 0.6-acre wetland would provide additional treatment of the effluent from the aerated lagoons via a process called denitrification, which would decrease the land area required for the slow rate land application (see below). The subsurface flow wetland would consist of a shallow HDPE-lined basin filled with gravel media and planted with emergent wetland vegetation. Effluent from the lagoons would flow through the gravel media layer, with the effluent level being maintained below the gravel surface at all times. Treatment would occur through physical, chemical, and biological mechanisms.

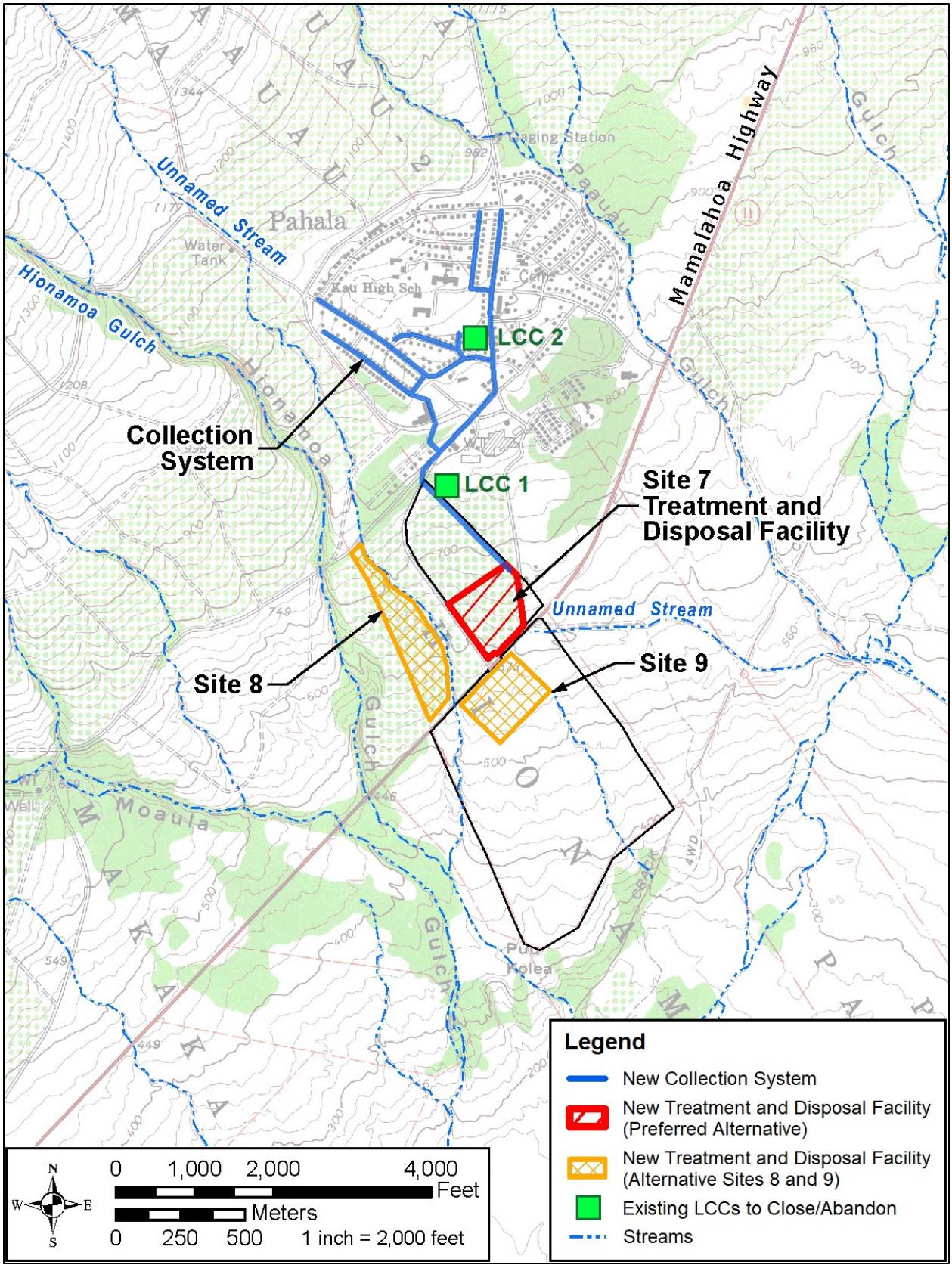


Figure 2.2. Elements of the Proposed Action

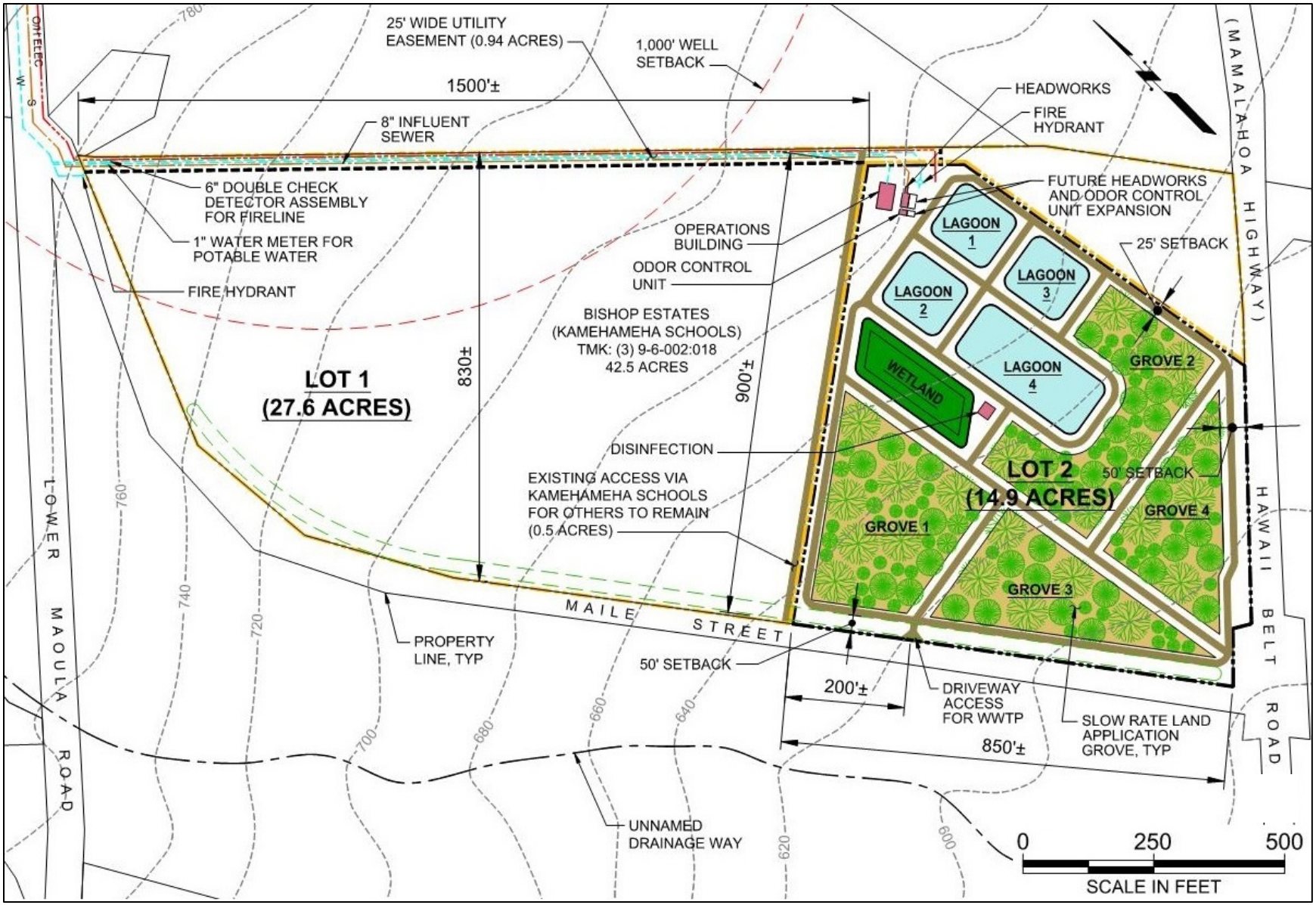


Figure 2.3. Preliminary Site Plan for New Wastewater Treatment and Disposal Facility at Site 7 (Preferred Alternative)

- Covered lagoon and disinfection. The 0.8-acre covered lagoon (Lagoon 4) would allow for effluent storage and algae removal, followed by disinfection to kill pathogens or render them incapable of reproduction or harm to humans. The lagoon would feature a floating cover of HDPE shade balls to prevent algae growth while allowing rainwater to pass through. Disinfection would occur through contact with chlorine solution derived from solid calcium hypochlorite in a chlorine contact tank, providing the necessary contact time for the disinfection process to occur.
- Slow-rate land application system. Disposal of the treated and disinfected effluent would be accomplished through land treatment in four groves of native, water-tolerant native trees occupying a total area of approximately 8.0 acres. Application of the effluent would be rotated to a different grove each day, resulting in a wet/dry cycle of 1-day wetting and 3-days drying.

Figure 2.4 shows a preliminary process schematic for the proposed secondary treatment and disposal facility. Figure 2.5 illustrates an example of a lagoon using a floating cover of shade balls.

EPA defines land treatment as "the application of appropriately pre-treated municipal and industrial wastewater to the land at a controlled rate in a designed and engineered setting. The purpose of the activity is to obtain beneficial use of these materials, to improve environmental quality, and to achieve treatment goals in a cost-effective and environmentally sound manner." Land treatment systems rely on soil and vegetation to achieve treatment objectives, rather than energy-intensive mechanical equipment. As such, they are considered to be a form of "natural" treatment. The slow-rate land application concept is to intermittently apply wastewater to vegetation growing in permeable soils. As the applied effluent percolates through the soil matrix or is taken up by the crop, it is treated by physical filtration and biological mechanisms. After an application period or wetting period, the surface is allowed to dry, and oxygen can enter the soil matrix, which aids aerobic biological treatment. The frequent wetting and drying of the soils also maintains the infiltration rate through the soil surface and minimizes clogging. This treatment process is effective for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), trace organics, phosphorus, metals and pathogen removal. Furthermore, nitrogen removal can be significant if it is necessary to manage the system for that objective.

The facility would also include an operations building (approximately 1,620 square feet (SF)), which would include an electrical room, chlorinator room, restroom, and maintenance/storage room. A standby power system would be provided by a pad-mounted diesel generator and aboveground fuel tank with capacity to support three consecutive days of operation. An electrical service panel would be equipped with a manual transfer switch and generator receptacle. This would provide a connection to a trailer-mounted generator, in the event of emergency generator failure during an extended power outage.

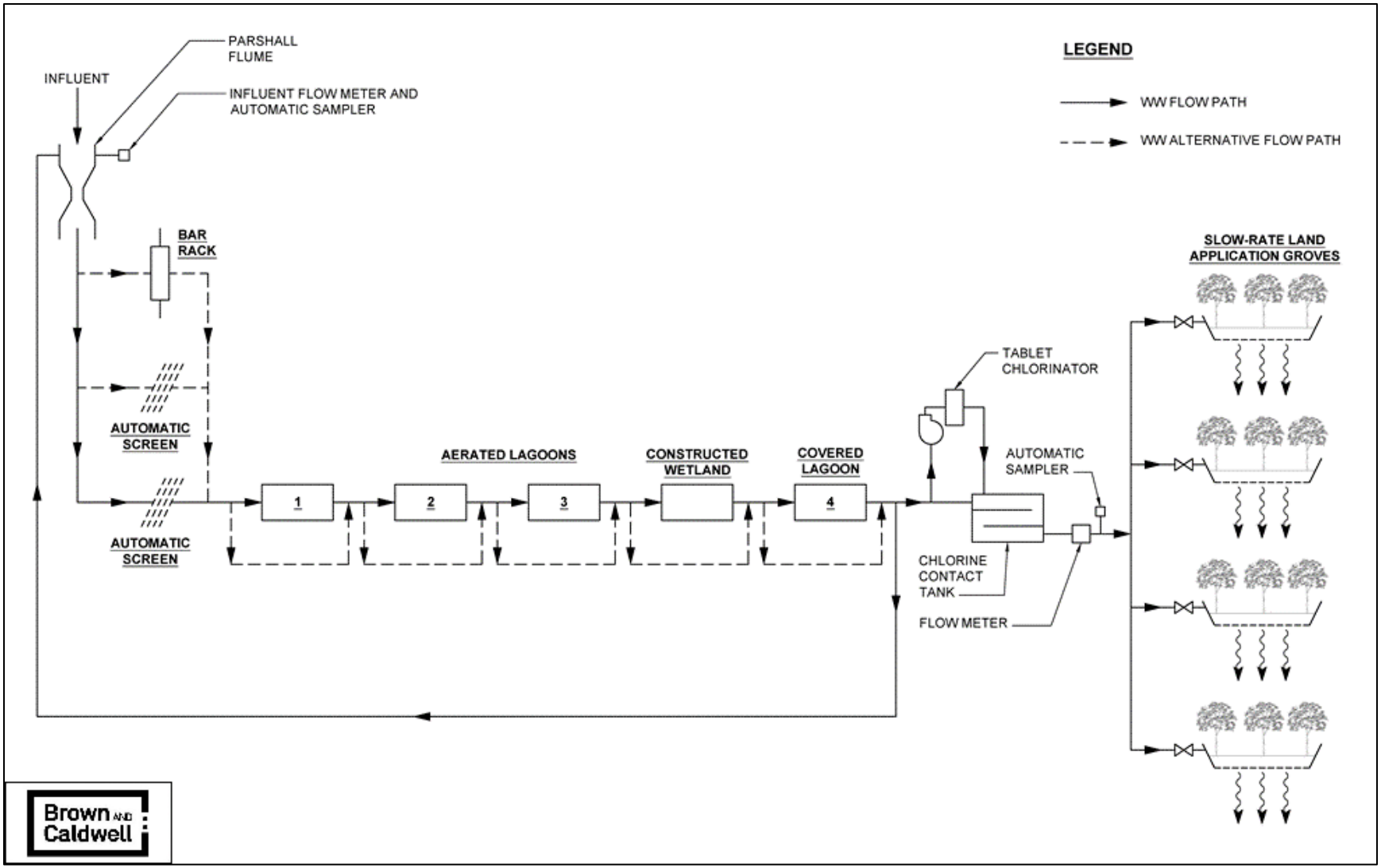


Figure 2.4. Preliminary Process Schematic for New Wastewater Treatment and Disposal Facility at Site 7 (Preferred Alternative)

Figure 2.5. Example of Shade Ball Floating Cover in a Lagoon

The entire wastewater treatment and disposal facility would be enclosed with a six-foot-high chain-link fence and posted to prevent public access. Gate(s) to the facility would be locked, except when County personnel are present. A 25-foot-wide by 1,500-foot-long easement located along the northern edge of the parcel would be used to provide access to utilities from Maile Street to the treatment and disposal facility. The easement would contain the incoming sewer line from the collection system, potable water line, and above-ground electric service from the Hawaiʻi Electric and Light Company (HELCO) system. The easement would not be improved as an access road. The above-ground electric service would likely consist of 480-volt, three-phase electrical power via a pole-mounted transformer to a service panel with a meter. Provided utilities would also include a land-line or cellular telephone telemetry system to connect the facility to the County of Hawaiʻi Department of Environmental Management (DEM) operations staff based in Hilo. Exterior site lighting would be limited to one shielded light mounted under the roof overhang of the operations building and one shielded light near the headworks. The exterior lighting would be manually switched and used only for emergency purposes; the facility would normally be unlit at night.

Construction of the wastewater treatment and disposal facility would require extensive site modifications, including the following:

- Clearing and grubbing of approximately 14.9 acres of macadamia nut trees within the southeast portion of Site 7 to accommodate the new facility, and clearing of up to approximately 0.9 acres of trees from within the utility easement – these trees would be disposed of at an approved site or re-used for some other purpose;

- Excavation to a depth of approximately 10 feet to provide the necessary capacity for the lagoons;
- Excavation to a depth of approximately 4 feet to provide the necessary depth for the media in the subsurface constructed wetland;
- Excavation to a depth of approximately 6 feet to provide sufficient depth for the planted groves and disposal of the effluent; and
- Construction of a berm (with approximate 4-foot height) on all four sides of the groves to contain rainfall from a 100-year, 24-hour storm event, with perimeter roads on the top of the berms to provide operator access.
- Construction of internal service roads to provide access to the new facilities.

Prior to construction of the treatment and disposal facility, the County would need to obtain the necessary discretionary and ministerial approvals from various Federal, State, and County agencies.

2.3.2 Construct New Wastewater Collection System

Under the Preferred Alternative, the County would construct a new sewer collection system in the Pāhala community to replace and expand upon the existing system of substandard gravity lines that convey sewage to the two LCCs. The new collection system would consist of a total of approximately 12,150 linear feet (LF) (2.3 miles) of corrosion-resistant polyvinyl chloride (PVC) piping almost entirely within the public ROW of seven public streets. This includes five streets in the western portion of the community (Maile, ʻIlima, Huapala, Hīnano, and Hala Streets) and two public streets in the eastern portion of the community (Puahala and Pīkake Streets). The new collection system would convey sewage to the new wastewater treatment and disposal facility at Site 7. Figure 2.6 shows the collection system plan.

The County would construct the collection system in two phases to ensure that residential units can maintain sewer system access all times. Phase 1 would construct segments totaling approximately 2,510 LF to divert sewage flows from the existing LCC collection system to the new treatment and disposal facility and would connect individual properties to this new collection system. Specifically, Phase 1 would include the following:

- A new 1,730-LF, 16-inch diameter line within the Maile Street ROW to intercept flows from the existing system serving ʻIlima, Huapala, Hīnano, and Hala Streets and convey this sewage to the new wastewater treatment and disposal facility at Site 7. This new line would be sized to accommodate the flows from the entire community.
- A new 780-LF, 14-inch diameter line partially within the Pikake Street ROW that would connect LCC 1 to the new line on Maile Street described above. A 350-LF portion of this line would run through an easement on a privately-owned parcel to access LCC 1.

Phase 2 would complete the new collection system by constructing segments totaling approximately 9,630 LF throughout Pāhala, installing pumps on selected properties, and connecting individual properties to the new collection system. These lines would range from a 14-inch line on Pikake Street to mostly 8-inch lines on the remaining streets and would run primarily within County ROWs for ease of access. However, an approximately 1,100-LF segment would follow the existing system alignment in an industrial area between ʻIlima and Maile Streets. The property (TMK 9-6-005:036) is owned by Edmund Olsen and leased to M L Macadamia Orchards. The County would obtain an easement within this area to access the site.

Phase 1 and Phase 2 streets would have a total of 120 lots connected to the wastewater collection system. These same lines can accommodate 65 newly accessible lots on the public streets.

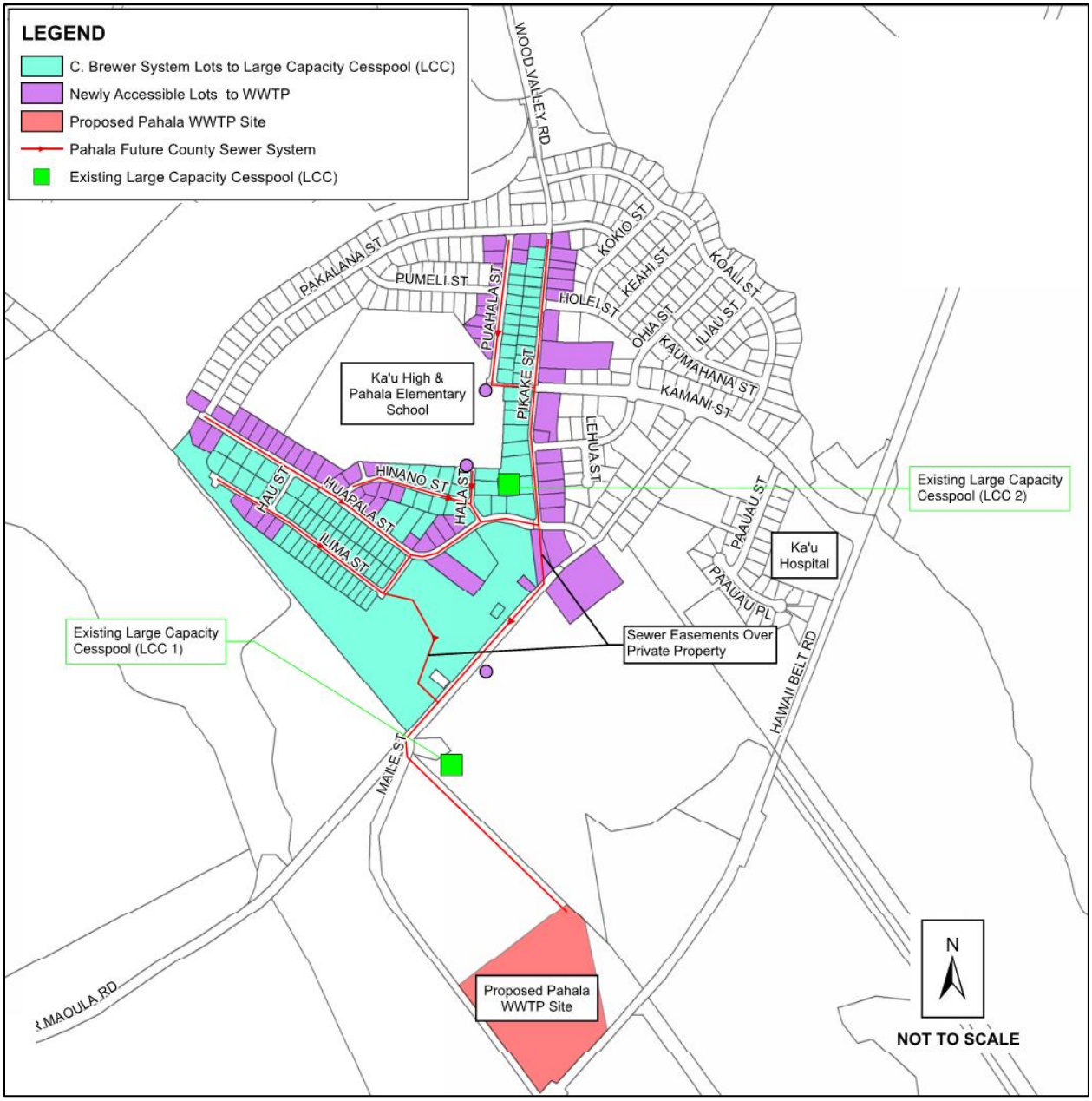


Figure 2.6. Preliminary Collection System Plan with New Wastewater Treatment and Disposal Facility at Site 7 (Preferred Alternative)

Construction of the new collection system would involve temporary impacts within the public ROWs of seven streets. The streets within the community are under the jurisdiction the County, with the exception of a privately-owned portion of Pikake Street for which the County would obtain an easement. The streets have been improved with asphaltic concrete (AC) surfaces; most shoulder areas are somewhat improved or consist of grassy swales. Most of the streets have two travel lanes, are approximately 22 to 24 feet wide (plus shoulders), and do not have curbs or gutters. Residential lots along the streets have driveways with direct access to the travel lanes. Overhead utility poles are located outside the travel lanes. Typical sewer trenches would be about 3 feet wide and at least 6 feet deep to allow the placement of the lines to meet County standards. The existing pavement would be sawcut, the trench would be excavated, sewer pipe installed,

and then the trench would be backfilled and compacted. The cut portion of the AC pavement would then be patched with new AC material.

The new collection system would be subject to the County of Hawaiʻi Code Chapter 21, Sewers. Specifically, Article 2 (Public Sewers), Section 21-5 states the following:

"(a) Owners of all dwellings, buildings, or properties used for human occupancy, employment, recreation, or other purposes, which are accessible to a sewer are required at their expense to connect directly with the public sewer within 180 days after date of official notice.

(b) If, due to rock, wastewater collection system depth, or other construction problems, a building cannot be practically served, the owner shall install, operate and maintain a residential pumping station.

(c) The director may grant a variance/exemption of the foregoing connection requirements to owners of single-family dwellings existing at the time of installation of the public wastewater system, if the following is found:

(1) There are special or unusual circumstances applying to the subject real property which exist that render the ability to connect to a wastewater system an extreme physical or financial hardship; and

(2) There are no other reasonable alternatives; and

(3) The variance is consistent with the general purpose of the chapter and will not be materially detrimental to public health, safety, or welfare."

Accordingly, additional newly accessible properties in Pāhala would be required to connect to the new wastewater collection system after it becomes operational. These other properties are near the existing service area and are presently connected to individual wastewater systems. Under the Preferred Alternative, the design of the new collection system would include stub-outs to accommodate the eventual connection of these newly accessible properties. However, the respective property owners would be responsible for the design and completion of these connections and for the proper closure of their individual wastewater systems.

Additionally, as discussed in Section 4, the State Department of Education will connect the Kaʻū High School and Pāhala Elementary School and the recently completed Kaʻū Gymnasium and Shelter to the new collection system following completion of the Proposed Action.

2.3.3 Close and Abandon Two Existing Large Capacity Cesspools

Under the Preferred Alternative, following completion of Phase 1 of the new collection system, the County would close and abandon LCC 1 and LCC 2 as instructed by DOH Safe Drinking Water Branch UIC requirements. HAR §11-23-19 sets forth the plugging and abandonment requirements, which state the following:

> *"(a) any owner who wishes to abandon an injection well shall submit an application, in accordance with Section 11-23-12, containing the details of the proposed abandonment. The DOH may require an abandoned well to be plugged in a manner which will not allow detrimental movement of fluids between formations. If required, plugging shall be completed by grouting with the tremie method in accordance with the Honolulu Board of Water Supply's "Water System Standards", dated March, 1977; or by some other method found appropriate and acceptable to the DOH; (b) The DOH may order an injection well to be plugged and abandoned when it no longer performs its intended purpose, or when it is determined to be a threat to the ground water*

resource. The owner shall schedule the plugging so that DOH staff may be present to monitor the abandonment operation."

The specific methods to be used for closure of the LCCs have not yet been determined but would be consistent with the requirements described above.

The two LCCs in Pāhala are readily accessible for closure activities. LCC 1 is located in a parcel that has been previously cleared and is currently overgrown with tall grasses. It may be necessary to clear a path for construction vehicles and equipment to access the LCC 1. Clearing an access road (or other similar work) would not be necessary to access LCC 2, which is located in the backyard of a residential lot with access via the house driveway.

2.3.4 Close and Abandon Existing Wastewater Collection System

Under the Preferred Alternative, following completion of Phase 2 of the new collection system, the County would close and abandon the existing C. Brewer wastewater collection system. This system includes some lines located in the back yards of residential lots and some within public streets; therefore, abandoning the lines in place would minimize impacts related to their excavation and removal. The cut ends of the abandoned laterals to the collection system would be plugged with concrete to prevent unauthorized use of the old system and to prevent maintaining an unused underground hydraulic conduit.

2.4 Proposed Action – Site 8 Alternative

Under the Site 8 Alternative, the County would perform the same actions as described in Section 2.4 for the Preferred Alternative, with the following exceptions:

- The new secondary wastewater treatment and disposal facility would be constructed at Site 8 instead of Site 7; and
- The new wastewater collection system would require approximately 1,600 feet of additional pipe within the ROW of Lower Maoula Road to reach Site 8.

The County would acquire, or obtain the right to develop and use, the parcel identified as Site 8 for construction of the new secondary wastewater treatment and disposal facility (see Figure 2.7). This 45.2-acre parcel (TMK: 9-6-002:021) is southwest of and adjacent to Site 7, across Maile Street and above Māmalahoa Highway. As with Site 7, it is owned by Kamehameha Schools and used as a macadamia nut orchard. Site 8 is more steeply sloped than Site 7, with slopes between approximately 10 and 20 percent. An unnamed branch of Hiʻonamoa Gulch crosses the site from northwest to southeast near the center of the parcel.

The secondary wastewater treatment and disposal facility at Site 8 would consist of the same treatment components, and would require the same support facilities and infrastructure, as the facility described in Section 2.4 for the Preferred Alternative. However, because of the steeper slopes in Site 8, use of this site would require larger slow-rate land application groves totaling approximately 12 acres. Also, depending on the selected configuration of the wastewater treatment facility and the land application groves, this alternative could require trenching and construction of piping across Hiʻonamoa Gulch within the site.

As with the Preferred Alternative, the Site 8 Alternative would close and abandon LCC 1 and LCC 2 following completion of Phase 1 of the new collection system and would close and abandon the existing C. Brewer wastewater collection system following completion of Phase 2 of the new collection system.

2.5 Proposed Action – Site 9 Alternative

Under the Site 9 Alternative, the County would perform the same actions as described in Section 2.4 for the Preferred Alternative, with the following exceptions:

- The new secondary wastewater treatment and disposal facility would be constructed at Site 9 instead of Site 7; and
- The new wastewater collection system would require approximately 3,200 feet of additional pipe within the ROW of Maile Street and across Māmalahoa Highway to reach Site 9.

The County would acquire, or obtain the right to develop and use, the parcel identified as Site 9 for construction of the new secondary wastewater treatment and disposal facility (see Figure 2.8). This 157-acre parcel (TMK: 9-6-002:049) is southeast of Sites 7 and 8, across Māmalahoa Highway. As with Sites 7 and 8, it is owned by Kamehameha Schools and used as a macadamia nut orchard. Slopes throughout Site 9 are between approximately 3 and 10 percent. A branch of Hiʻonamoa Gulch crosses the site from northwest to southeast near the upper portion of the parcel.

The secondary wastewater treatment and disposal facility at Site 9 would consist of the same treatment components, and would require the same support facilities and infrastructure, as the facility described in Section 2.4 for the Preferred Alternative, and the slow-rate land application groves would total approximately 8 acres. However, because the site is located across Māmalahoa Highway from the Pāhala community, it would require construction of piping and other utilities within the highway ROW, which would require approval by the State of Hawaiʻi Department of Transportation. Also, depending on the selected configuration of the wastewater treatment facility and the land application groves, this alternative could require trenching and construction of piping across Hiʻonamoa Gulch within the site.

As with the Preferred Alternative, the Site 9 Alternative would close and abandon LCC 1 and LCC 2 following completion of Phase 1 of the new collection system and would close and abandon the existing C. Brewer wastewater collection system following completion of Phase 2 of the new collection system.

2.6 No-Action Alternative

Under the No-Action Alternative, the County would continue to use the two existing LCCs in Pāhala, existing substandard gravity sewer lines, and individual septic systems. No additional properties would be added to the community sewer system under this alternative.

This alternative would not provide the Pāhala community with an acceptable wastewater collection, treatment, and disposal system; would not fulfill the purpose and need for action described in Section 2.2; and would result in non-compliance with the AOC between EPA and the County.

2.7 Development of Site Alternatives and Selection of Preferred Alternative

For several years, the County has considered various alternative sites in the Pāhala area for construction of a new wastewater treatment and disposal facility. The County has primarily considered sites that could be obtained at “minimal or no” cost and currently vacant sites to avoid displacement and relocation.

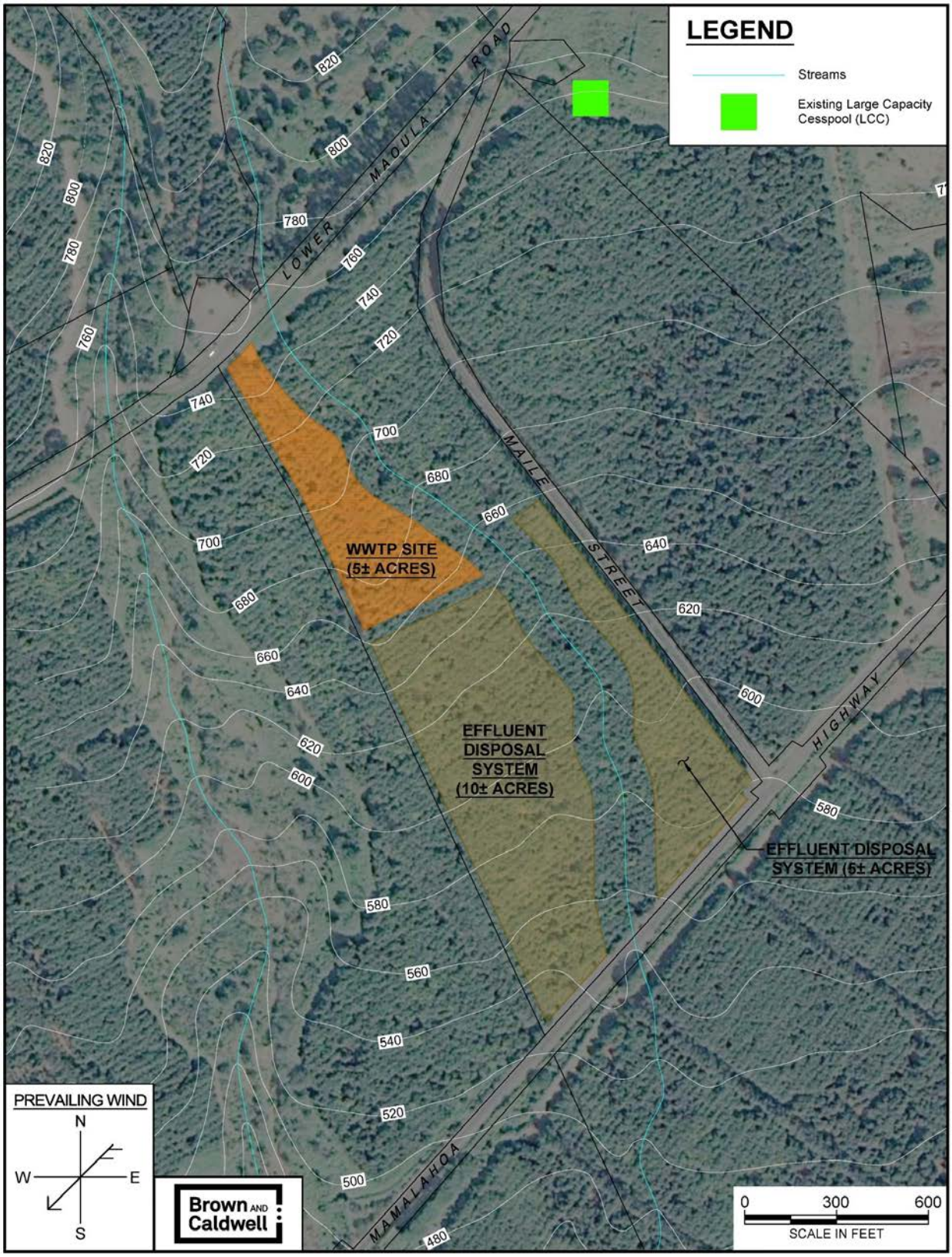


Figure 2.7. Site 8 Alternative – Preliminary Site Plan for New Wastewater Treatment and Disposal Facility

Figure 2.8. Site 9 Alternative – Preliminary Site Plan for New Wastewater Treatment and Disposal Facility

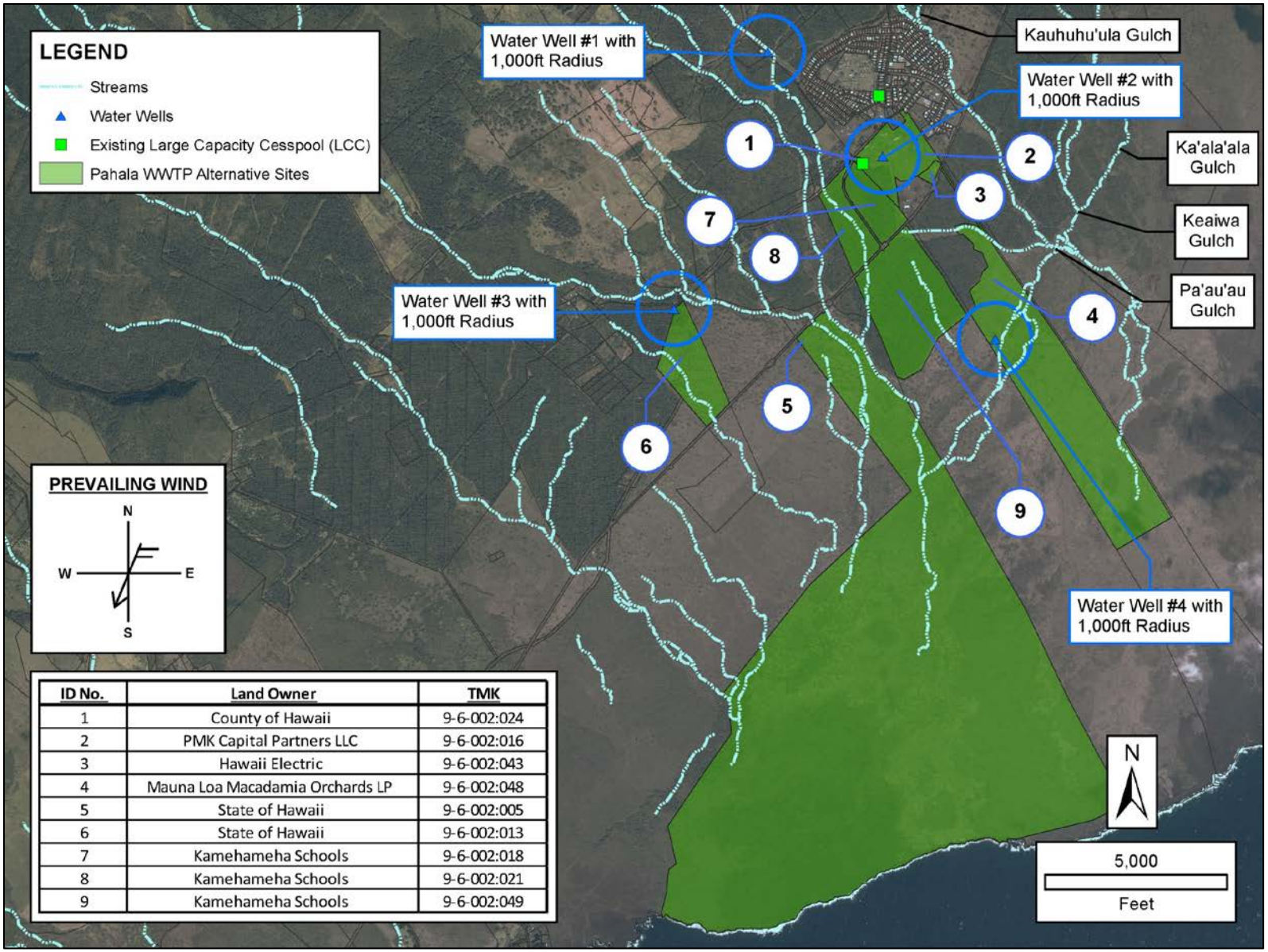
The County identified candidate sites based on three primary criteria. First, the site would have to be appropriate for the preliminary design of the treatment and disposal facility. For example, the site would need to have sufficient area to accommodate the facility and have soil conditions that are suitable for effluent management purposes. Second, access to the site would allow the County to meet the various requirements of the AOC that stipulated closure of the LCCs by June 2021. Third, the environmental impacts of construction of the treatment and disposal facility should be considered. For example, the site would need to be located where a treatment and disposal facility would not create nuisance impacts (e.g., odor or visual impacts) to the community.

Based on these three primary criteria, and considering additional suggestions from the Pāhala community obtained during Community Outreach meetings in December 2017, the County identified nine candidate sites for the proposed wastewater treatment and disposal facility. Figure 2.9 shows the locations of these nine sites, identifies the land owners for each, and depicts their proximity to the existing LCCs. The County evaluated the suitability of each candidate site according to the following process:

1. Twenty-one criteria within four general categories (environmental, social and cultural; location and site; land use and availability; and collection system and service area) were established and defined for the analysis.
2. Six “fatal flaw” conditions were identified. Sites with a fatal flaw were eliminated from further consideration.
3. Relative weighting factors were established for each category and criteria. Environmental, social and cultural considerations, and location and site characteristics were weighted highest (35 percent each), the collection system and service area category was weighted at 20 percent, and the land use and availability category was weighted at 10 percent.
4. Sites were mapped using GIS. Data such as soil type, location of subsurface and surface water, topography, zoning and prevailing wind direction were determined.
5. Each site was evaluated and scored for the twenty-one criteria.
6. A weighted ranking was determined for each site based on the weighting factors established in Step 3.
7. A preferred site was identified, based on the weighted high scores.

As a result of this process, the County identified three sites (Sites 7, 8, and 9) as reasonable alternatives for construction of the wastewater treatment and disposal facility under the Proposed Action. The final scores for Sites 7, 8, and 9 were 4.33, 4.06, and 4.10 respectively, out of a total possible score of 5. Based on this analysis, Site 7 was selected as the Preferred Alternative. The site is easily accessible, has good soils for a land application system, and is close to the existing LCCs. Site 8 has a stream bisecting the parcel lengthwise that complicates siting of the treatment and disposal facility. Site 9 also has some surface water within the parcel but is also more difficult to access given its location relative to existing roads. Site 9 would require construction of additional access roads to facilitate construction and operation of the treatment and disposal facility and would also require a longer transmission line given its distance from the existing LCCs.

Additional information on the specific scoring criteria and the results of the weighted analysis can be found in the June 2018 *Pahala Wastewater Treatment Plant Preliminary Engineering Report* (PER), which is included as Appendix B.



ID No.	Land Owner	TMK
1	County of Hawaii	9-6-002:024
2	PMK Capital Partners LLC	9-6-002:016
3	Hawaii Electric	9-6-002:043
4	Mauna Loa Macadamia Orchards LP	9-6-002:048
5	State of Hawaii	9-6-002:005
6	State of Hawaii	9-6-002:013
7	Kamehameha Schools	9-6-002:018
8	Kamehameha Schools	9-6-002:021
9	Kamehameha Schools	9-6-002:049

Figure 2.9. Locations of Nine Candidate Sites Considered for New Wastewater Treatment and Disposal Facility

Section 2.3 describes the Preferred Alternative under the Proposed Action, including the preferred site (Site 7) for construction of the treatment and disposal facility. Sections 2.4 and 2.5 describe the other two sites (Sites 8 and 9, respectively) identified as reasonable alternatives for construction of the treatment and disposal facility under the Proposed Action. Section 2.8.1 describes the six sites (Sites 1-6) that were eliminated from consideration as reasonable alternatives.

2.8 Alternatives Considered but Not Carried Forward

2.8.1 Other Site Alternatives

During evaluation of site alternatives, six "fatal flaw" conditions were identified, and sites with a "fatal flaw" were eliminated from further consideration. For more information on fatal flaw conditions, refer to the PER (Appendix B).

(a) Alternative Site 1: LCC Parcel

Site 1 (TMK 9-6-002:024) is owned by the County of Hawaiʻi. This parcel is only 0.41 acres, precluding it from being suitable for a wastewater treatment facility due to parcel size. As a result of this "fatal flaw," Site 1 was removed from further consideration.

(b) Alternative Site 2: Macadamia Nut Plant Site

Site 2 (TMK 9-6-002:016) is located adjacent to the 0.41-acre County LCC parcel. This parcel occupies about 64.8 acres, is privately-owned and contains an active macadamia nut processing facility that occupies only a portion of the entire parcel. The site is located near the Pāhala community meaning it would be close the collection system, limiting the environmental impacts related to construction of the influent and fire protection lines.

However, due to the soil type, Site 2 would require an area of approximately 200 acres to accommodate the slow rate land application basins. The unoccupied area of Site 1 is located on the northern portion of the parcel. As a result, the proposed treatment and disposal site would be nearly adjacent to a residential area and the Pāhala Hongwanji Mission. Use of this site would potentially have adverse impacts to residents and the Pāhala Hongwanji Mission. For these reasons, use of Site 2 for the treatment and disposal facility is not considered a reasonable and feasible alternative.

(c) Alternative Site 3: HELCO Substation

Site 3 (TMK 9-6-002:043) is owned by HELCO and occupies 4.46 acres. It is currently used as a substation to supply electrical power to the Pāhala community. The size of the parcel and the requirement for approval from the State of Hawaiʻi Public Utilities Commission made use of Site 3 for the treatment and disposal facility not a reasonable and feasible alternative.

(d) Alternative Site 4: Mauna Loa Macadamia Nut Parcel

Site 4 (TMK 9-6-002:048) is located east of Māmalahoa Highway and occupies about 339 acres. The parcel is privately owned and contains an active macadamia orchard. An unnamed gulch runs east-west between the highway and orchard area that would need to be crossed by influent and fire protection lines. The State may require a Stream Channel Alteration Permit should the two lines alter the stream banks. Placing the lines below the stream might require separate pump stations for the lines to access the treatment and disposal facility. The only access to Site 4 is from Māmalahoa Highway. Approval would be needed to construct within the right-of-way. Due to the soil type, Site 4 would require an area of approximately 200 acres to accommodate the slow rate land application basins. For these reasons, use of Site 4 for the treatment and disposal facility is not considered a reasonable and feasible alternative.

(e) Alternative Site 5: State of Hawaiʻi

Site 5 (TMK 9-6-002:005), a vacant parcel owned by the State of Hawaiʻi, is located about 3,300 feet south of Maile Street below Māmalahoa Highway and occupies about 2,160 acres. Hiʻonamoa and Moaʻula gulches lie between Maile Street and Site 3 and influent and fire protection lines would need to cross the gulches to reach the site. A Stream Channel Alteration Permit would be required should the two lines alter the stream banks. Approval would also be required to construct within the state right-of-way. Due to the soil type at Site 5, approximately 200 acres would be required to accommodate the slow rate land application basins. For these reasons, use of Site 5 for the treatment and disposal facility is not considered a reasonable and feasible alternative.

(f) Alternative Site 6: State of Hawaiʻi

Site 6 (TMK 9-6-002:013), a vacant parcel owned by the State of Hawaiʻi, is located about 1.25 miles feet south of Maile Street above Māmalahoa Highway and occupies about 75.8 acres. Influent and fire protection lines would need to cross two, and possibly three, gulches to reach the site. A Stream Channel Alteration Permit would be required if the lines alter the stream banks. Approval would also be required to construct utilities within the highway ROW. Because Site 6 lies above the highway, one or two pump stations might be required for the influent line. Due to the soil type at the site, approximately 200 acres of this soil type would be required to accommodate the slow rate land application basins. For these reasons, use of Site 6 for the treatment and disposal facility is not considered a reasonable and feasible alternative.

2.8.2 Other Wastewater Treatment Alternatives

(a) Septic Tank Alternatives

Several septic tank alternatives were identified and considered. Additional details on each alternative can be found in the PER (Appendix B).

- Community Septic Tank. Based on current design criteria and current flow projections, an approximately 800,000-gallon community septic tank would be necessary to provide the extended detention times needed to optimize treatment performance, to avoid the need for frequent septage pumping, and to account for peak flow rates. A community septic tank of this size would require pumping on a 3-year interval. Septic tanks produce hydrogen sulfide, reduced sulfur compounds, and other odorous gases; a community septic tank would concentrate these emissions to a single point source, requiring treatment with a dual-stage scrubber to avoid nuisance odor conditions. More significantly, a community septic tank would not be capable of achieving the effluent quality standards (less than 30 mg/L of both BOD_5 and TSS) specified in HAR 11-62-23.1. Therefore, use of a community septic tank is not considered to be feasible.
- Converting LCC to Seepage Pit. Converting LCC 1 to a seepage pit regulated as an injection well (LCC 2 could not be converted as it is on private land) would lead to numerous potential compliance issues with HAR 11-23-07, which regulates injection wells. The condition and structure of LCC 1 is unknown, and HAR 11-62-25 requires all new and proposed effluent disposal systems are required to have a backup system. No such system could be feasibly constructed as new injection wells are not allowed.
- Leachfield Disposal. To meet DOH's leachfield design criteria, a minimum of 30 acres of land would be required to meet loading rate and redundancy requirements. Achieving even distribution of effluent over a leachfield of this size would be challenging. Therefore, leachfield disposal is not considered to be feasible.
- Conversion to Individual Wastewater Systems. Many of the lots in Pāhala are too small to construct individual septic systems, and for those that couldn't accommodate a septic

tank, the soils have percolation rates that are too slow to allow for seepage pits based on HAR 11-62-34 regulations. Residents with sufficient space for a seepage pit would need to import fill soil to create elevated mound systems. Conversion to individual wastewater systems is therefore not considered feasible.

(b) Other Treatment Alternatives

Several other treatment alternatives were considered for the project. Additional details can be found in the PER (Appendix B).

- Option 1: Aerated Lagoons/Constructed Wetland/Land Application (Proposed Treatment Method). Option 1 consists of an aerated lagoon treatment system with a constructed wetland and disinfection, followed by land application for effluent management. This is the proposed treatment method for the Pāhala wastewater treatment and disposal facility.
- Option 2: R-1 Treatment/Land Application. Option 2 consists of a treatment system designed to produce recycled water that meets Hawaiʻi Department of Health (DOH) R-1 recycled water criteria. The R-1 treatment system would be followed by land application.
- Option 3: R-1 Treatment/Seasonal Water Recycling. Option 3 consists of a treatment system similar to Option 2 to produce R-1 recycled water. The recycled water would then be used to irrigate nearby macadamia nut orchards. A water recycling analysis no irrigation is typically needed between October and March because precipitation exceeds evaporation during those months. During months when irrigation is unnecessary, recycled water could be land applied.
- Option 4: R-1 Treatment and Storage for 100 Percent Recycling. Option 4 adds a seasonal storage reservoir for recycled water. HAR 11-62 requires a disposal system for all recycled water systems to provide a means for disposal of water that does not meet R-1 standards or disposal of excess water should the seasonal storage reservoir capacity be exceeded during an exceptionally wet year. Storage in open reservoirs can also lead to algae growth and odor issues, requiring additional treatment to meet R-1 criteria before irrigation.
- Option 5: Maximum Practical Treatment. Option 5 consists of implementing advanced wastewater treatment processes that represent maximum practical treatment, eventually producing R-1 water. The same issues associated with utilizing or storing R-1 water described for Options 3 and 4 would apply to Option 5.

The treatment alternatives described above were removed from consideration due for several reasons, as described below. Additional details can be found in the PER (Appendix B).

- Labor Requirements. Options 2 through 5 require daily site visits from operators based in Hilo to conduct sampling required for R-1 compliance. These options also consist of mechanical treatment technology that requires more operator attention. Option 1 (preferred alternative) requires weekly visits by treatment plant operators based in Hilo, with periodic maintenance visits as needed.
- Operational Complexity. Options 2 through 5 require Grade IV certification through HAR 11-61 due to the complexity of treatment processes. Generally, the County has difficulty attracting and retaining Grade IV operators. Option 1 requires an operator certification level of Grade 1, the lowest level established by HAR 11-61.
- Energy Consumption. Options 2 through 5 require a substantial amount of electrical energy due to the use of mechanical processes. Option 1 requires significantly less energy due to the use of natural treatment systems.

- Sludge Management. Options 2 through 5 would require an anaerobic digester for sludge management, with solids trucked to a landfill on a weekly basis. Option 1 would require sludge removal from lagoons approximately once every 15 to 20 years. The resulting solids are well-digested and inoffensive.

Additionally, Living Machine® technology was suggested during community outreach meetings. The technology has been implemented in buildings but there is no evidence of the technology being used at a municipal scale. The proposed non-proprietary treatment system (aerated lagoons and subsurface flow wetland) uses essentially the same natural treatment processes as the Living Machine®, but on a municipal scale.

2.8.3 Other Effluent Management Options

Several effluent management options were evaluated for feasibility as an alternative to land application. The options described below were removed from consideration due to their lack of feasibility and other concerns as outlined herein.

- Ocean Discharge. Ocean discharge of treated effluent is not considered a viable option for Pāhala due to the long distance from the site to the shoreline, the high cost to construct an outfall, stringent receiving water quality standards, high ocean water monitoring costs, and the difficulty and length of time required to secure permits.
- Subsurface Disposal via Injection Wells. Per HAR, Title 11, Chapter 23, disposal to ground water via an injection well is not allowed west (mauka) of the DOH UIC line. Because the town of Pāhala is located mauka of the UIC line, an injection well is not a viable option.
- Water Recycling. Water recycling was considered as an alternative effluent management option but removed from consideration due to the low irrigation demand in the Pāhala area and DOH requirements for all water recycling programs to have a 100-percent backup system. Storage systems could be constructed but could lead to issues as described in Section 2.8.2.
- Drain Field. A drain field (i.e., a leachfield) is an alternative effluent management option, but was removed from consideration due to the reasons outlined in Section 2.8.2, most notably the large amount of land required for a drain field and difficulties with distributing effluent across such a large area.

2.9 Relationship to 2007 Final Environmental Assessment

In August 2007, the County of Hawaiʻi DEM issued a Final EA for the Nāʻālehu-Pāhala Large Capacity Cesspool Conversion project. The County then made a Negative Declaration, also referred to as a Finding of No Significant Impact (FONSI), regarding the project on August 10, 2007, and published a notice of the determination in the August 23, 2007 issue of the Office of Environmental Quality Control (OEQC) publication *The Environmental Notice*.

As described in that Final EA, the County DEM initiated the project to address the closure of the LCCs within the Nāʻālehu and Pāhala communities. Although that Final EA addressed both communities, the proposed improvements were essentially similar for both communities. For Pāhala, the proposed project was to construct new sewer collection systems located primarily within the public ROWs and to replace the existing LCCs with six DOH-approved septic tanks for wastewater treatment and reuse of LCC 1 as a seepage pit for the effluent disposal system.

After the issuance of the Final EA and Negative Declaration/FONSI in 2007, the County conducted additional study and evaluation of the proposed LCC conversion project. The County eventually concluded that the LCC conversion project described in the 2007 Final EA would not meet the need to provide a collection system and a treatment and disposal facility, close the

LCCs, and provide for the future needs of the Pāhala community. This determination was based on several factors, including the following:

- The capacity, structure, and condition of LCC 1 are not known; the County attempted to determine the structure and condition of LCC 1 via inspection by closed circuit television but could not ascertain its condition due to technological limitations. Additionally, poor results from soil percolation tests influenced the County to consider looking at larger land to construct a secondary treatment system to fulfill a longer-term vision of a higher level of wastewater treatment and options for plant expansion for possible community growth.
- HAR 11-62-25 requires new and proposed effluent disposal systems to have a backup disposal system capable of handling the peak flow. However, a second seepage pit would most likely not be allowed as the site is located mauka of the UIC line. Also, if the existing seepage pit were to fail, a replacement could not be constructed.
- The Kaʻū Community Plan was adopted as Ordinance No. 2017-66 in October 2017. This plan requires the County to provide for eventual construction of a collection system and treatment and disposal facility to serve the entire Pāhala community. Although the Kaʻū Community Plan was adopted subsequent to the Final EA, the Pāhala LCC conversion project would need to be consistent with the plan. Increasing flow to the converted existing LCC used as a seepage pit would not be allowed because it is located mauka of the UIC line. Therefore, the use of the existing LCC as a disposal system could prevent the County from providing the community's desired future wastewater needs.
- As discussed in Section 2.8.2(a), the use of a community septic tank would present odor concerns and would not be capable of meeting state effluent quality standards.

Based on the above considerations, the County has decided not to move forward with the Pāhala community LCC conversion project described in the 2007 Final EA and Negative Declaration/FONSI, and is instead evaluating the alternatives described in this Draft EA.

2.10 Other Considerations

2.10.1 Zoning Considerations

Lands within the Pāhala community are designated "Urban" by the State Land Use Commission. The wastewater treatment and disposal project site is designated "Agricultural".

The 14.9-acre treatment and disposal facility would be owned by the County of Hawaiʻi and managed and operated by the County of Hawaiʻi DEM. The treatment and disposal facility would be a "public use" as defined by the Hawaiʻi County Code (HCC) Chapter 25, Zoning, Section 25-1-5, as a use conducted by or a structure or building owned or managed by the federal government, the State of Hawaiʻi, or the County to fulfill a governmental function, activity, or service for public benefit and in accordance with public policy.

To ensure compliance with relevant code, the County would obtain a Plan Approval from the Planning Department for the treatment and disposal facility. Also, the County would submit a Special Use Permit (SUP) application to the County Planning Commission.

2.10.2 Land Transfer

Construction of the portions of the collection system located within County ROWs would not require further land transfer approvals. As previously discussed, two short segments of the planned collection system would be located with privately owned parcels. The County would obtain easements from the land owner(s) as part of the construction process.

The Hawaiʻi County Code Chapter 23, Subdivisions, states that all subdivision plats and all streets or ways within the County created for the purpose of partitioning land shall be approved by the County Planning Department Director. Further, Section 23-11 includes requirements on lot sizes. This section states the following:

> *"standards of this chapter shall not be applicable to public utility or public rights-of-way subdivisions and their remnant parcels; provided that the Planning Department Director, upon conferring with the County Director of Public Works and Manager-Chief Engineer of the Department of Water Supply, may require necessary improvements to further the public welfare and safety."*

Lastly, Section 23-12 (Submission of application and plans; filing) states the following:

> *"(a) A person desiring to subdivide land or desiring to partition land by creation of a street within the County shall submit an application for subdivision and preliminary and final plans and documents for approval as provided in this chapter and State law; (b) No subdivision plat may be filed with the Bureau of Conveyances or Land Court until submitted to and approved by the Planning Department Director."*

The County has conducted a Phase 1 Environmental Site Assessment of the entire 42.5-acre parcel comprising Site 7. This review did not identify any recognized environmental concerns or liabilities associated with acquiring portions of Site 7.

2.10.3 Hawaiʻi Revised Statutes (HRS) Chapter §205 Considerations

Lands within the Pāhala community are designated as "Urban" by the State Land Use Commission. The wastewater treatment and disposal project site is designated as "Agricultural". According to HRS Chapter §205-4.5, permissible uses within the agricultural districts are the following:

> *"(a) Within the agricultural district, all lands with soil classified by the Land Study Bureau's detailed land classification as overall (master) productivity rating class A or B shall be restricted to the following permitted uses:*
>
> *(1) Cultivation of crops, including crops for bioenergy, flowers, vegetables, foliage, fruits, forage, and timber;*
>
> *(2) Game and fish propagation;*
>
> *(3) Raising of livestock, including poultry, bees, fish, or other animal or aquatic life that are propagated for economic or personal use;*
>
> *(4) Farm dwellings, employee housing, farm buildings, or activities or uses related to farming and animal husbandry.*
>
> *(5) Public institutions and buildings that are necessary for agricultural practices;*
>
> *(6) Public and private open area types of recreational uses, including day camps, picnic grounds, parks, and riding stables, but not including dragstrips, airports, drive-in theaters, golf courses, golf driving ranges, country clubs, and overnight camps;*
>
> *(7) Public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings such as booster pumping stations, but not including offices or yards for equipment, material, vehicle storage, repair or maintenance, treatment plants, corporation yards, or other similar structures;*

(b) Uses not expressly permitted in subsection (a) shall be prohibited, except the uses permitted as provided in Sections 205-6 and 205-8."

HRS Chapter §205-6 (Special permit) states the following:

"(a) The county planning commission may permit certain unusual uses within agricultural and rural districts other than those for which the district is classified. Any person who desires to use the person's land within an agricultural or rural district other than for an agricultural or rural use, as the case may be, may petition the planning commission of the county within which the person's land is located for permission to use the person's land in the manner desired. Each county may establish the appropriate fee for processing the special permit petition."

Based on the above, a SUP application for the treatment and disposal facility would be prepared by DEM for submittal to the Planning Commission.

THIS PAGE INTENTIONALLY LEFT BLANK

3 DESCRIPTION OF EXISTING CONDITIONS, IMPACTS AND MITIGATION MEASURES

3.1 Climate

3.1.1 Existing Conditions

(a) <u>All Alternative Sites</u>

Climate on the Island of Hawaiʻi and more broadly throughout the state can be characterized as having low day-to-day and month-to-month variability. Differences in the climate of various areas are generally attributed to local differences in geology and topography that create microclimates with different temperature, humidity, wind and rainfall, and associated local ecosystems (Department of Geography, 1998).

The climate of Pāhala is typical of the predominantly dry condition found in the Kaʻū District. The National Oceanic and Atmospheric Administration (NOAA) designates the Kaʻū area as a Humid Tropical Zone with transitional lowland areas in locations between windward and leeward regions. The area receives less orographic rainfall since it is not oriented normal to trade wind flow and exhibits a distinctive summer dry season.

Temperatures in the Kaʻū District generally range between 70 and 80 degrees Fahrenheit during daylight hours and between 60 and 70 degrees Fahrenheit during night hours. The National Weather Service maintains a rainfall gauge at Pāhala. For calendar year 2017, the Hawaiʻi Rainfall Summary shows a total of 40.58 inches rain at Pāhala, about 71 percent of the average of 57.00 inches. Below-average totals were also observed at two other rainfall gauges nearby at Kahuku Ranch and South Point.

Prevailing trade winds in the Kaʻū District area are from the southeast and usually dominate from April to November. Wind speeds average about 15 miles per hour and vary between approximately 10 to 20 miles per hour. Winds from the southwest occur less frequently, mainly during the winter associated with “Kona” storms (Department of Geography, 1998).

3.1.2 Impacts and Mitigation Measures

(a) <u>All Alternative Sites</u>

There is the potential for construction-related and operational greenhouse gas emissions under the proposed action. Heavy equipment during construction may temporarily emit greenhouse gases during their operation and trucks used to transport supplies and equipment may cause emissions outside of the Pāhala area. Operation of the wastewater system under the Proposed Action also has the potential for minor greenhouse gas emissions due to operations at, and one-per-week vehicle trips to, the proposed treatment and disposal facility site. These emissions are expected to be minor and are not expected to contribute substantially to emissions from the Pāhala area.

Climate conditions in the Kaʻū District are likely to change in coming decades. Changes in average annual temperature are unlikely to impact the proposed wastewater treatment and disposal facility and its effluent because there is no discharge to surface water sources and therefore the temperature of streams in the area is unlikely to be impacted by the project. Average annual precipitation is also likely to change, but climate models are uncertain in projections for Hawaiʻi, with projections for the area surrounding Pāhala ranging from a minor decrease in annual precipitation (up to a 4-percent decrease) to up to 20-percent increase depending on the model

scenario (hot/dry vs. warm/wet), based on modeling conducted by EPA (USEPA, 2017). Another climate concern for coastal areas and islands is sea level rise. Because the Pāhala community lies about 3.8 miles from the coast and between 800 to 1,000 feet above msl, sea level rise is not expected to impact the proposed project.

Climate models also predict changes in the intensity of storm events. An ensemble model projection developed by EPA indicates anywhere from a 1.0-percent to a 19.8-percent increase in 100-year storm intensity by 2035 depending on the scenario used for the modeling ("stormy" vs. "not as stormy"). By 2060, projections range from 1.9 percent to 38.5 percent. The large amount of uncertainty in projections makes it difficult to determine potential impacts of increased storm intensity on the project, but it is likely that there is some change in storm intensity in the next few decades. The Proposed Action will be designed to collect sanitary wastewater only; the community's stormwater would be managed by other means. Some nominal inflow of stormwater into wastewater collection systems through manhole covers and other hydraulic pathways is normal and can be expected to increase with increasing storm intensity in the future. Because the proposed wastewater treatment and disposal facility does not intercept stormwater flows, there is unlikely to be a direct impact on inflow to the plant, although more intense or more frequent storms could impact the open aerated lagoons, subsurface flow constructed wetland, and land application processes from precipitation falling directly on these systems. All potentially affected processes would be bermed to contain the 100-year, 24-hour storm event while maintaining at least two feet of freeboard to account for the uncertainty of the climate model projection uncertainties.

(b) No-Action Alternative

Under the No-Action Alternative, the existing LCCs are at risk of impacts due to climate change, specifically changes in precipitation and storm intensity. The nature of the LCCs makes them more exposed to these threats, potentially leading to impacts to ground water, surface water, and other resource areas.

3.2 Topography

3.2.1 Existing Conditions

The Pāhala community lies on the slope of Mauna Loa, west (mauka) of Māmalahoa Highway and occupies an area of about 0.61 square miles. The developed area of Pāhala slopes down at about 6 percent from the northwest to the southeast, from an elevation of 1,000 feet above msl to 800 feet above msl over a distance of 3,500 feet. The slope of the streets in the community approximately follows the contours to maintain level or appropriately sloped grades to allow vehicle travel. On certain streets, this condition results in house lots on the downhill side of the street to be several feet below the road surface, while those on the uphill side lie several feet above.

(a) Preferred Alternative (Site 7)

The 42.5-acre preferred location for the Proposed Action is generally situated on a southeast facing slope with an average slope of approximately 8.7 percent and a maximum of 18.9 percent. The elevation of the parcel ranges from 580 to 780 feet above msl.

(b) Alternative Site 8

The 45.2-acre Site 8 parcel faces approximately southeast with an average slope of approximately 9 percent and a maximum of 28.2 percent. The elevation of the parcel ranges from approximately 540 to 740 feet above msl. An unnamed branch of Hionamoa Gulch crosses the site from northwest to southeast near the center of the parcel.

(c) Alternative Site 9

The 157-acre Site 9 parcel faces approximately southeast with an average slope of approximately 7 percent and a maximum of 10 percent. The elevation of the parcel ranges from approximately 300 to 600 feet above msl. Two unnamed south-flowing branches of Hionamoa Gulch cross portions of the parcel.

3.2.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7)

Construction of the new wastewater collection system would require trenching in locations throughout the Pāhala community, primarily within the ROW of public streets plus two short segments within easements. Trenches would typically be about 3 feet wide and at least 6 feet deep. Due to the existing topography, several locations may also require installation of pumps. Once the line is placed in the trench, the affected area would be backfilled to restore the existing topography, resulting in minimal localized effects to the site topography.

The construction of the wastewater treatment and disposal facility would involve grading, excavating, and fill activities on approximately 14.9 acres at Site 7. Excavation to depths of approximately 4 to 10 feet would be required to provide necessary capacity for the lagoons, constructed wetlands, and planted groves. An approximately 4-foot tall berm would be constructed on all four sides of the groves to contain rainfall from a 100-year, 24-hour storm event. As discussed in Section 3.7.2, stormwater and erosion control plans would be developed, necessary construction permits would be obtained, and appropriate stormwater and erosion control measures would be implemented.

Abandonment of the two LCCs and the existing wastewater collection system would not affect topography within the affected areas.

(b) Alternative Site 8

Under this alternative, the topographic impacts and mitigation measures would be similar to those described above for the Preferred Alternative (Site 7), with the following differences:

- Construction of an additional 1,600 feet of collection system piping to reach Site 8 would require additional trenching. The affected areas would be backfilled to restore the existing topography.
- Due to the steeper slopes at Site 8, construction of the wastewater treatment and disposal facility would require grading, excavating, and fill activities on approximately 4 additional acres to accommodate the terracing required to construct the slow-rate land application groves on the steeper site.

(c) Alternative Site 9

Under this alternative, the topographic impacts and mitigation measures would be similar to those described above for the Preferred Alternative (Site 7); however, an additional 3,200 feet of trenching would be required to extend the collection system piping, potable water line, and fire protection line to Site 9. The affected areas would be backfilled to restore the existing topography.

(d) No-Action Alternative

The No-Action Alternative would not involve grading, excavation, or fill activities, and therefore would not impact topography in the Pāhala area.

3.3 Geology

3.3.1 Existing Conditions

(a) All Alternative Sites

The Island of Hawaiʻi was formed by the activity of five shield volcanoes. These shield volcanoes are Kohala (extinct), Mauna Kea (has had activity during recent geologic time), Hualalai (last erupted in 1801), and Mauna Loa and Kilauea (both of which are still active).

The project site is situated at the eastern end of the island and on the lower, southeastern flank of the Mauna Loa Volcano. This volcano appears to be made up of at least two huge shield volcanoes built around two separate eruptive centers, referred to as the Mauna Loa shield. The Mauna Loa shield has been built principally by eruptions along two rift zones that extend in a southwest and east-northeast direction from the caldera. Rift zones are elongated areas of ground fissures where volcanic activity such as earthquakes and volcanic eruptions are concentrated. In contrast, few eruptions have taken place along the lower northeast rift zone.

Pāhala is situated on the slopes of Mauna Loa. The surrounding area consists of several inter-stratified beds of volcanic ash that sit upon the exposed bedrock. The Pāhala area is known to contain lava tubes, which often occur in many places around the Island of Hawaiʻi. Generally, a lava tube is a natural conduit or void that forms when molten lava flows beneath the hardened surface of a previous lava flow. When the volcanic eruption stops, and the lava drains out, a lava tube forms in the void. Lava tubes can range in size from a few inches to more than 25 feet in diameter. The tubes are generally not visible from the surface and the diameter and length can usually be identified only through subsurface probing or geophysical surveys.

3.3.2 Impacts and Mitigation Measures

(a) All Alternative Sites

The presence of lava tubes at each of the alternative wastewater treatment and disposal facility sites is possible but unknown. A geotechnical investigation of the selected site would occur during the design and engineering process. Grading, excavating, and fill activities during construction of the facility and the new collection system would occur no deeper than approximately 10 feet below grade and thus would have negligible impacts on the geology in the Pāhala area. If/when bedrock is encountered during excavation for the Proposed Action, removal would be accomplished using hydraulic and/or pneumatic hammers consistent with other construction activities on the Hawaiian Islands.

Abandonment of the two LCCs and the existing wastewater collection system would not affect geology within the affected areas.

Impacts and mitigation measures associated with seismic hazards are discussed in Section 3.4.

(b) No-Action Alternative

The No-Action Alternative does not involve any construction activities or modification to the existing conditions, and therefore would not cause any impacts to geology in the Pāhala area.

3.4 Seismic Hazard

3.4.1 Existing Conditions

(a) All Alternative Sites

Earthquakes in the Hawaiian Islands are primarily associated with volcanic eruptions resulting from the inflation or shrinkage of magma reservoirs beneath, which shift segments of the volcano.

The Island of Hawaiʻi experiences thousands of earthquakes each year; however, most are so small that they can only be detected by instruments. Although difficult to predict, an earthquake of sufficient magnitude could cause structural or other damage to public facilities including wastewater collection systems. The seismic risk classification of the Island of Hawaiʻi is Zone 4 (USGS, 1997).

Earthquakes may occur before or during an eruption or may result from the underground movement of magma that comes close to the surface. On the Island of Hawaiʻi, earthquakes directly associated with the movement of magma are concentrated beneath the active Kilauea and Mauna Loa Volcanoes. Typically, the risk of seismic activity and degree of ground movement decreases with the distance from these active volcanoes. A few of the island's earthquakes are less directly related to volcanism. These originate in the zones of structural weakness at the base of the volcanoes or deep within the earth beneath the island.

Several destructive earthquakes have occurred on the Island of Hawaiʻi. The locations of larger damaging on-island earthquakes since 1868 have generally occurred in the southeast portion of the island near Kilauea, with the most recent destructive earthquake on this south flank occurring on June 26, 1989 with a magnitude of 6.1. More recently, a Magnitude 6.9 earthquake occurred on May 4, 2018 offshore and east of Kilauea, though this earthquake was classified as non-destructive.

3.4.2 Impacts and Mitigation Measures

(a) <u>All Alternative Sites</u>

Hawaiʻi County Code Chapter 5 (Building), Section 5.3 indicates the "International Building Code, 2006 Edition" (IBC) – copyrighted and published in 2006 by the International Code Council, Incorporated – is adopted by the County. Chapter 5 is the applicable code for the construction of buildings, structures, and facilities in the County. The purpose of the seismic provisions in the IBC is primarily to safeguard against major structural failures and loss of life; limiting damage or maintaining functions is not a primary purpose. At a minimum, structures are to be designed and constructed to resist the effects of ground motions from seismic events. The seismic hazard characteristics described in the IBC are based on the seismic zone and proximity of the site to active seismic sources.

The wastewater treatment and disposal facility would be designed and constructed to meet the requirements of the 2006 IBC and Hawaiʻi County Code Chapter 5 and would comply with seismic loadings established for the County of Hawaiʻi. This would minimize the potential for an uncontrolled release of untreated or partially treated sanitary wastewater, emergency generator diesel fuel, or disinfection chemicals from the facility during a seismic event.

(b) <u>No-Action Alternative</u>

The No-Action Alternative includes no construction or modification to existing conditions, and therefore would not impact seismic hazard in the Pāhala area.

3.5 Volcanic Hazard

3.5.1 Existing Conditions

(a) <u>All Alternative Sites</u>

In 1997, the U.S. Geological Survey prepared an updated volcanic hazard zone map for the Island of Hawaiʻi. The map shows lava flow hazard zones for the five on-island volcanoes. The current map divides this island into zones ranked from 1 (highest hazard) through 9 (lowest hazard) based on the probability of coverage by lava flows. Hazard zones from lava flows are based mainly on

the location and frequency of both historic and prehistoric eruptions. Hazard zones also consider the larger topographic features of volcanoes that affect the distribution of lava flows.

Pāhala has been assigned a rating of Zone 3, which designates areas that are less hazardous than Zones 1 and 2 because of the greater distance from recently active vents and (or) because of topography. One to five percent of Zone 3 areas have been covered by eruptions since 1800, and 15 to 75 percent have been covered within the past 750 years.

3.5.2 Impacts and Mitigation Measures

(a) All Alternative Sites

Based on the volcanic hazard map, the potential for damage is moderate, given the distance between Pāhala community and active vents and hazards. At this time, the County has no construction restrictions in Zone 3 areas. Thus, at this time, the volcanic hazard designation would not affect the construction and operation of a collection system or treatment and disposal facilities. Although the potential for volcanic activity in or around Pāhala is present, the likelihood of that impact is relatively small. In the event of a volcanic eruption that threatens the Pāhala area, it is likely that damage would occur to residences, the treatment and disposal facilities, the collection system, and other assets in the area. There are no mitigation measures to prevent the potential impacts from volcanic activity, and the impacts would be similar regardless of the location of the treatment and disposal site or treatment system employed.

(b) No-Action Alternative

The No-Action Alternative involves no change to the status quo, so the current risk faced by Pāhala and the LCCs would remain consistent.

3.6 Soils

3.6.1 Existing Conditions

(a) All Alternative Sites

Figure 3.1 shows the soil types in the Pāhala area, based on the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Soil Survey of the Island. Soils at all alternative sites for the proposed wastewater treatment and disposal facility are primarily classified as series 521 – Naʻalehu medial silty clay loam, 3 to 10 percent slopes. This soil profile consists of approximately 17 inches of medial silt loam over hydrous silty clay loam with a depth to bedrock greater than 59 inches. This soil series has moderately-high to high permeability characteristics, and generally consists of well-drained soils that formed in volcanic ash. As shown in Figure 3.1, the northwest half of Site 8 is composed of a slightly different soil type, series 522 – a Naʻalehu medial silty clay loam, 10 to 20 percent slopes.

The western portion of the collection system and the wastewater treatment and disposal facility alternative sites consist of ash fields on pāhoehoe lava fields with soils that are well drained with a runoff class of low. The remainder of the area for the collection system project has a soil classified as Puʻuʻeo-Naʻalehu complex with land consisting of basic volcanic ash fields over aʻa lava flows. Soils in these areas are somewhat excessively drained with a runoff class of very low.

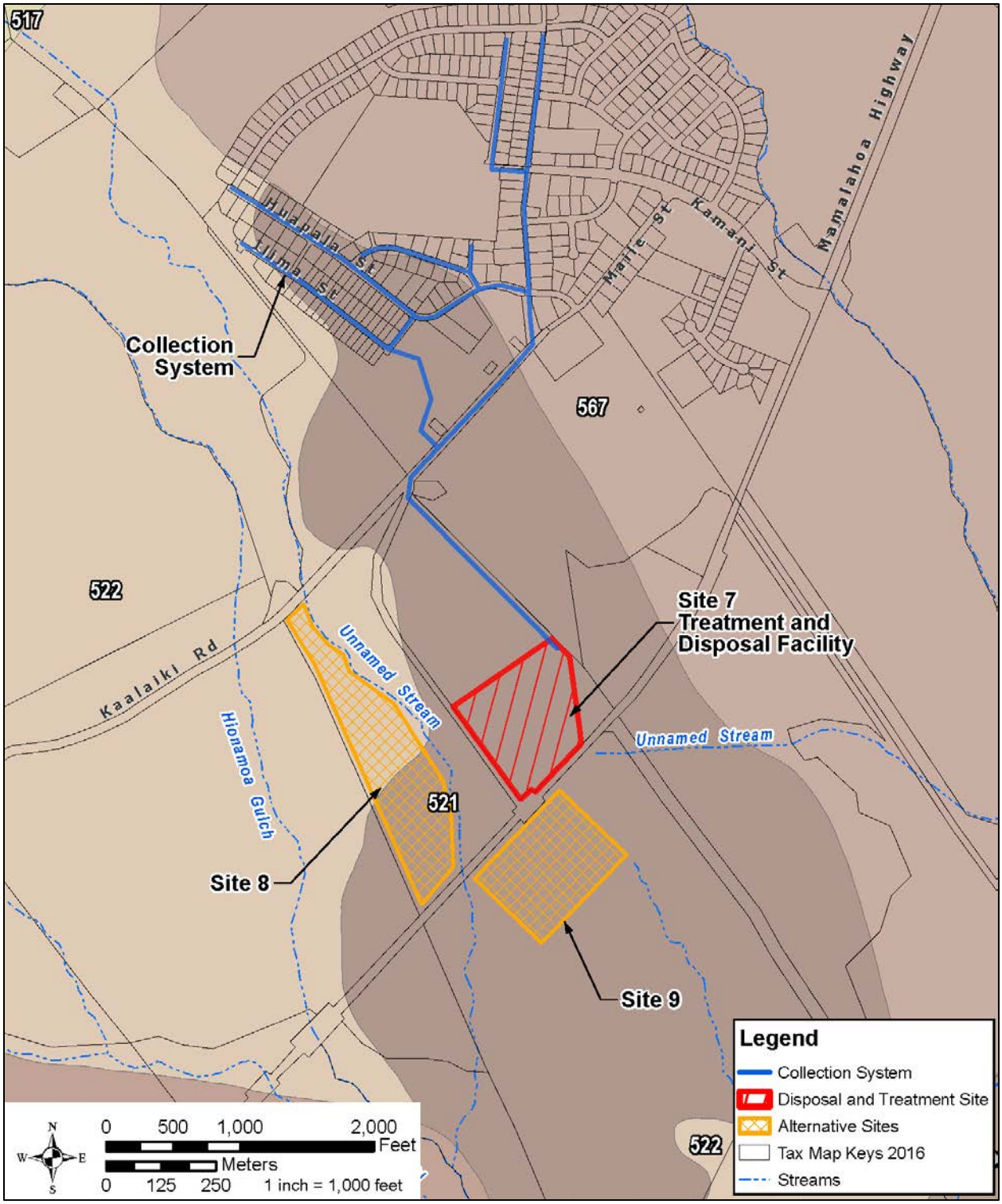


Figure 3.1. Pāhala Area Soils Map

3.6.2 Impacts and Mitigation Measures

(a) All Alternative Sites

The collection system would be constructed below the travelways or shoulders of the streets in the Pāhala community. These were previously disturbed when the streets and shoulders were originally constructed, and therefore the collection system would not create new adverse impacts to soils in the area.

Construction of the wastewater treatment and disposal facility would require removal of macadamia nut trees and clearing and excavating for construction of various improvements as described in Section 2.4. The soils within the proposed treatment and disposal facility at Site 7, as well as similar locations at Sites 8 and 9 that are also part of the macadamia nut orchard, were previously disturbed during planting of the macadamia nut trees. An HDPE liner would be placed below the excavated areas for the lagoons and subsurface flow wetland, mitigating adverse impacts to soils in the area as well as ground water.

The proposed location for slow-rate land application basins would also require excavation to allow placement of the soil medium (approximately 8 acres for Sites 7 and 9, and approximately 12 acres for Site 8). Although the soils would be disturbed, the natural permeability characteristics of the soil would mitigate adverse impacts due to construction. The Proposed Action would incorporate appropriate stormwater and erosion control measures in accordance with approved plans to ensure that soil erosion and transport during construction activities are minimized. Continued operation of the land application basins is not expected to cause adverse impacts to surrounding soils due to the physical and biological treatment that would occur as effluent percolates through the soil and is taken up by planted vegetation.

Abandonment of the two LCCs and the existing wastewater collection system would not affect soils within the affected areas.

(b) No-Action Alternative

The No-Action Alternative would not involve any direct or indirect impacts to soils. Continued use of the existing LCCs and wastewater collection system would not result in impacts to soils in the Pāhala area.

3.7 Surface Water

3.7.1 Existing Conditions

The Pāhala community is located between two surface water sources, Pāʻauʻau Gulch to the north and east, and an unnamed branch of Hionamoa Gulch to the south and west. The USGS topographic map shows flows from Pāʻauʻau Gulch end about 6,500 feet from the coast, while the unnamed branch flows into Hionamoa Gulch about 3,000 feet southwest of Maile Street. Flows from Hionamoa Gulch end about 6,000 feet from the coast. Figure 3.1 illustrates the known streams and gulches within the Pāhala area.

(a) Preferred Alternative (Site 7)

There are no surface water sources located within the Pāhala community near the existing or proposed wastewater collection system or the existing LCCs. Similarly, there are no surface water sources located within Site 7.

(b) Alternative Site 8

The unnamed branch of Hionamoa Gulch crosses the Site 8 parcel from northwest to southeast near the center of the parcel. The gulch is classified as a riverine wetland in the National Wetland

Inventory (NWI), but it is unknown whether this has been confirmed through a field survey and delineation. There are no other wetlands or surface water bodies located on this parcel.

(c) Alternative Site 9

Two unnamed south-flowing branches of Hionamoa Gulch cross portions of the Site 9 parcel. Also, an unnamed east-flowing branch of Pāʻauʻau Gulch originates in the Site 9 parcel near the southeast boundary of the Site 7 parcel; this branch flows into Pāʻauʻau Gulch approximately 4,000 feet east of the Site 9 parcel. These gulches are classified as riverine wetlands in the NWI, but it is unknown whether this has been confirmed through a field survey and delineation. There are no other wetlands or surface water bodies located on this parcel.

3.7.2 Impacts and Mitigation Measures – Construction Activities

(a) Preferred Alternative (Site 7)

Given the cumulative areal extent of disturbance for the wastewater treatment and disposal facility and the new collection system, the Proposed Action would require coverage under a National Pollutant Discharge Elimination System (NPDES) construction stormwater permit. The NPDES permit would include best management practice (BMP) measures such as use of silt fences or filter socks along the perimeter of each construction site and sediment traps at drainage inlets. Further, to minimize the potential for inadvertent leaks or spills of fuels and other petroleum products, construction vehicles and equipment would be well maintained and kept at a temporary staging area where runoff is controlled.

Construction trenches would require the contractor to submit erosion control and stormwater control plans to the County and the DOH. Typically, the plans would require installation of erosion and sediment control BMPs. This may include the use of perimeter controls, such as silt fences or filter socks. These BMPs would be used to surround all construction sites, including material storage and staging areas and all construction sites related to the collection system, to control pollutants in stormwater flow from the sites during construction.

The construction contract documents would require that a Site-Specific Construction BMP plan be prepared, addressing the measures that will be implemented onsite to prevent stormwater pollution. This may include spill response measures, waste management procedures, and other pollution prevention activities. The NPDES permit would also require periodic BMP inspections (and maintenance of associated documentation) to ensure the construction activities are compliant with the BMPs, Stormwater Pollution Prevention Plan (SWPPP), and NPDES permit.

Construction of the treatment and disposal facility would result in an increase in impervious surfaces. Hawaiʻi County Code, Chapter 27, Section 20, requires an on-site drainage plan to accommodate any runoff caused by a proposed development, and requires all runoff to be retained within the site. An on-site drainage system within the developed area would collect runoff via grated inlets or swales. These flows would be conveyed to on-site drainage detention systems, such as subsurface linear infiltration or depressed detention basins, to detain flows and volumes to their pre-development condition. Typically, a 1-hour, 10-year storm event is used to determine the size of the on-site drainage system. As stated in Hawaiʻi County Code, Chapter 27, Section 20:

> *(e) All developments requiring a site drainage plan under Section 25-2-72(3) shall submit such a plan for review and approval by the director of public works. The site drainage plan shall comply with sections 27-20(a) and (b) and section 27-24, and shall include a storm water disposal system to contain run-off caused by the proposed development, within the site boundaries, up to the expected one-hour, ten year storm event, as shown in the department of public works "Storm Drainage Standards," dated*

October 1970, or any approved revision, or by any nationally-recognized method meeting with approval of the director of public works. Runoff calculations shall include the effects of all improvements.

(f) Storm water shall be disposed into dry wells, infiltration basins, or other approved infiltration methods. The development shall not alter the general drainage pattern above or below the development.

To ensure that there is no adverse impact on adjacent or downstream properties due to post-development flows, landscape buffers with dirt berms would be constructed around most of the perimeter of the property, acting as secondary containment in the event of a large storm event. The planted groves for the land application system would be constructed with an approximately 4-foot-high berm on all four sides to contain the peak treated effluent flows plus rainfall from a 100-year, 24-hour storm event. Once the berms are constructed, no adverse effects to the surrounding areas would be likely during operation of the treatment and disposal facility for a storm of that magnitude.

Overall, the potential for construction-related impacts on surface water resources is temporary and adherence to BMPs will minimize the potential for these impacts to occur.

Abandonment of the two LCCs and the existing wastewater collection system would not affect surface waters within the affected areas. A single NPDES permit would be secured for all elements of the project, including LCC closure.

(b) Alternative Sites 8 and 9

All of the same information presented above for the Preferred Alternative (Site 7) is relevant to Alternative Sites 8 and 9. The same permits would be required, and the same or similar construction practices and BMPs would be implemented to mitigate potential impacts.

One difference between the Preferred Alternative (Site 7) and Alternative Sites 8 and 9 is the presence of south-flowing branches of Hionamoa Gulch in Sites 8 and 9, as shown in Figure 3.1. Depending on the selected configuration of the wastewater treatment facility and the land application groves, Alternative Sites 8 or 9 could require trenching and construction of piping across the gulch. A Stream Channel Alteration Permit would be required should the piping alter the stream banks. Extra attention would be required to ensure that BMPs are implemented to prevent erosion and sedimentation that could impact the surface water bodies. The potential for impacts to surface water is greater at Sites 8 and 9 due to the presence of these gulches.

(c) No-Action Alternative

The No-Action Alternative includes no construction activities, and therefore would not lead to a construction-related impact to surface water.

3.7.3 Impacts and Mitigation Measures – Operation of Wastewater System

(a) Preferred Alternative (Site 7)

EPA defines land treatment as “the application of appropriately pre-treated municipal and industrial wastewater to the land at a controlled rate in a designed and engineered setting. The purpose of the activity is to obtain beneficial use of these materials, to improve environmental quality, and to achieve treatment goals in a cost-effective and environmentally sound manner” (USEPA, 2006).

The soils at the Preferred Alternative site (Site 7) are suitable for slow-rate land treatment. Slow-rate land treatment consists of irrigation of land and vegetation with treated effluent. Significant further treatment is provided as the water percolates through the soil, the vegetation uses the nutrients in the effluent as fertilizer and transpires a portion of the applied water. The proposed

wastewater treatment and disposal facility would be designed to intermittently apply treated effluent to native trees and vegetation growing on permeable soils. After an application period or wetting period, the surface can dry, and oxygen can enter the soil matrix, which aids aerobic biological treatment. The proposed project estimates a reduction of greater than 99 percent in the annual load of five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and phosphorus to the environment compared to the current LCCs, and a decrease of 83 percent in the annual load of nitrogen compared to the existing LCCs. As a result, operation of the collection system and the treatment and disposal facilities would not create adverse impacts to surface water resources of the Pāhala area.

(b) Alternative Sites 8 and 9

All of the same potential impacts described for the Preferred Alternative (Site 7) would apply for Alternative Sites 8 and 9. However, the presence of streams on both Sites 8 and 9, as shown in Figure 3.1, heightens the risk of potential impact from the wastewater treatment and disposal facility on surface water resources. BMPs could help mitigate these potential impacts, and siting of the facility and land application sites would be important to avoid adverse impacts to surface water sources.

(c) No-Action Alternative

The No-Action Alternative includes no modifications to the existing landscape. As such, any impacts to surface water resources would be caused by the existing LCCs. Closure of the LCCs is mandated by EPA regulations due to increased risk of impacts to water supplies and public health from continued use of LCCs.

3.8 Ground Water

3.8.1 Existing Conditions

Ground water occurs within portions of geologic formations where aquifers receive and store water. Depending on geology of the area, many areas on the island rely on ground water wells to obtain drinking water. To protect the quality of underground sources of drinking water from contamination by subsurface disposal of fluids, Hawaiʻi has adopted the UIC program administered by the State DOH Safe Drinking Water Branch. Chapter 340 E, HRS, and Title 11, HAR Department of Health Chapter 23, Underground Injection Control set forth the requirements related to protection of underground sources of drinking water.

Under HAR Chapter 11-62, Appendix F, a minimum separation of 1,000 feet from existing wells is required for wastewater treatment sites.

(a) Preferred Alternative (Site 7)

On April 3, 2018, in response to the pre-assessment notification, the DOH Safe Drinking Water Branch indicated that the proposed wastewater treatment and disposal project site at Site 7 is located above the UIC line and, as such, on top of underground sources of drinking water. To avoid impacts to drinking water wells, sewage injection wells cannot be constructed above the UIC line.

The State of Hawaiʻi Department of Land and Natural Resources Commission on Water Resource Management (CWRM) maintains information on various types of wells throughout the state. The CWRM indicated that one County and one private well are located in the Pāhala area. The CWRM confirmed that the County well and storage tank are located approximately 5,000 feet north of Site 7. The USGS topographic map shows the tank lies at about 1,040 feet above msl, which is approximately 400 feet higher in elevation than Site 7. The private well is located within TMK: 9-

6-002:016, the parcel that contains the existing LCC and lies adjacent to Site 7. The CWRM has indicated this well is used for agricultural purposes, not for domestic purposes.

(b) Alternative Sites 8 and 9

The existing conditions discussed above for the Preferred Alternative (Site 7) are similar to Alternative Sites 8 and 9. Compared to the Preferred Alternative (Site 7) parcel, Site 8 is located a similar distance away, while Site 9 lies further away from the existing County drinking water well and the private well. There is a well to the southeast of the Site 9 parcel, but the parcel is not located within a 1,000-foot radius of the well.

3.8.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7)

The approximately 6-foot trenches needed to support the collection system would be relatively shallow in relation to ground water resources in the Pāhala area. Thus, construction of the collection system would not affect ground water resources in the area.

The treatment and disposal facility would require excavation for the lagoons, subsurface constructed wetland, and the planted groves. Preliminary plans show the lagoons would require about 10 feet of excavation, the subsurface constructed wetland about 4 feet and the planted groves about 6 feet. Construction activities would follow an approved SWPPP to minimize potential adverse impacts to ground water resources and stormwater during construction activities.

The lagoons and the subsurface constructed wetlands would be lined to prevent infiltration to the ground water. As previously described, the incoming sewage would be treated in the lagoons, further treated in the subsurface wetland, and then disinfected prior to application of effluent to the planted groves. The use of a slow-rate land application system following treatment in lagoons and the subsurface constructed wetlands would be very effective at removing pollutants and nutrients from the effluent. Compared to the existing LCCs, the proposed wastewater treatment and disposal facility would decrease loading of BOD_5, TSS, and phosphorus by greater than 99 percent, and the release of nitrogen by 83 percent.

For these reasons, and because of the separation (both elevation and horizontal distance) between Site 7 and the uphill County drinking water well, construction and operation of the treatment and disposal facility would not affect ground water resources in the Pāhala area.

While use of the two LCCs has not resulted in documented impacts to ground water or drinking water resources, abandonment of the LCCs would remove a potential source of such impacts. Abandonment of the existing wastewater collection system would not affect ground water within the affected areas.

(b) Alternative Sites 8 and 9

The ground water impacts and mitigation measures discussed above for the Preferred Alternative (Site 7) would also apply to Sites 8 and 9. The construction of the proposed collection system and the treatment and disposal facility at either Site 8 or Site 9 would not affect ground water resources in the Pāhala area. As discussed above, the closure of the LCCs would remove a potential source of adverse impacts to ground water and drinking water resources.

(c) No-Action Alternative

The No-Action alternative has the potential to adversely impact ground water resources due to the continued operation of the existing LCCs. EPA regulations mandate the closure of LCCs to prevent potential impacts on ground water resources.

3.9 Flood Risk

3.9.1 Existing Conditions

(a) <u>All Alternative Sites</u>

The Pāhala community is located between two surface water sources, Pāʻauʻau Gulch to the north and east, and an unnamed branch of Hionamoa Gulch to the south and west. The USGS topographic map shows flows from Pāʻauʻau Gulch end about 6,500 feet from the coast, while the unnamed branch flows into Hionamoa Gulch about 3,000 feet southwest of Maile Street. Flows from Hionamoa Gulch end about 6,000 feet from the coast. The unnamed branch of Hionamoa Gulch runs through Alternative Sites 8 and 9 and approximately 200 to 600 feet west of the Site 7 parcel.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Community Panel No. 155166 1800F, effective date September 29, 2017 shows that most of the Pāhala area is located in *Zone X*, which designates areas determined to be outside the 0.2-percent annual chance (500-year) floodplain. A small portion of the community of Pāhala, including some land within the collection system project site, is located within *Zone X – Other Flood Areas*, indicating areas within the 0.2-percent annual chance (500-year) floodplain, or areas with a 1-percent annual chance of flooding with average flood depths less than 1 foot.

According to the FIRM, both existing LCCs are also located within *Zone X*. However, LCC-1 is very close to the edge of the 500-year floodplain.

On April 16, 2018, in response to the pre-assessment notification, the State of Hawaiʻi Department of Land and Natural Resources Engineering Division stated the responsibility for conducting research as to the flood hazard designation for the project site lies with the project proponent. Also on April 16, 2018 and in response to the pre-assessment notification, the County of Hawaiʻi Department of Public Works confirmed that the proposed treatment and disposal project site at Site 7 is designated as *Zone X* on the FIRM and is outside the 500-year floodplain. See Appendix A for the responses to pre-assessment consultation letters.

3.9.2 Impacts and Mitigation Measures

(a) <u>All Alternative Sites</u>

The Proposed Action would not result in construction of new facilities within the 500-year floodplain. Although a small portion of the proposed collection system is located within the 500-year floodplain, the associated trenching operations would be temporary and would not alter the 500-year floodplain. Thus, no impacts to the existing floodplain are expected.

Abandonment of the two LCCs and the existing wastewater collection system would not affect floodplains within the affected areas.

(b) <u>No-Action Alternative</u>

The No-Action Alternative, specifically the continued operation of LCC-1, could lead to impacts during a flooding event. LCC-1 is located very close to an area mapped as within the 0.2-percent annual chance (500-year) floodplain. The existing collection system is substandard and in poor condition. A large flood could potentially cause the collection system and/or LCC to overflow as a result of stormwater inflow and result in an uncontrolled release of raw sewage, thus potentially contaminating flooded areas and creating a public health hazard.

3.10 Agricultural Lands

3.10.1 Existing Conditions

In November 1965, the Land Study Bureau (LSB) at the University of Hawaiʻi issued L.S. Bulletin No. 6, *Detailed Land Classification–Island of Hawaiʻi*. The LSB compiled and interpreted data on geology, topography, climate, water resources, soils, and crops and conducted field investigations to create a land classification for the island. Bulletin No. 6 assigned two types of ratings for each land type: the overall or master productivity rating, which reflects degree of overall suitability for agricultural use, ranging from A (Very Good) to E (Very Poor); and selected use ratings, which indicate the degree of suitability for selected use alternatives. Bulletin No. 6 has not been revised or re-issued and remains as the reference document for lands classified by the LSB.

In addition to the LSB rating, the State of Hawaiʻi has developed the Agricultural Lands of Importance to the State of Hawaiʻi (ALISH) Classification System. This system was developed and compiled in 1977 by the State Department of Agriculture with assistance from the NCRS, U.S. Department of Agriculture (formerly the Soil Conservation Service) and the College of Tropical Agriculture at the University of Hawaiʻi as part of a national effort to inventory important farmlands. Lands not considered for classification within this system are developed urban lands (over ten acres), natural or artificial bodies of water (over ten acres), public use lands, forest reserves, lands with slopes in excess of thirty-five percent, and military installations (except undeveloped areas over ten acres). The ALISH Classification System identifies the following three categories of land (equivalent NRCS categories in parentheses):

- Prime Agricultural Lands (Prime Farmlands) – Land that has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods.
- Unique Agricultural Lands (Unique Farmlands) – Land that has a special combination of soil quality, location, growing season, and moisture supply, and is used to produce sustained high-quality yields of a specific crop when treated and managed according to modern farming methods.
- Other Important Agricultural Land (Additional Farmland of Statewide and Local Importance) – Land other than Prime or Unique Agricultural Land that is also of statewide or local importance to agricultural use.

Figure 3.2 and Figure 3.3 show the LSB and ALISH classifications, respectively, in the project areas.

The 2012 Census of Agriculture-County provides the most recent information related to acreage planted for various fruits and nuts across the state and for each county. These data show a total of 18,006 acres of macadamia nuts were planted in the state, 17,387 acres of which were planted in the County, comprising about 96.6 percent of the state total.

(a) Preferred Alternative (Site 7)

The LSB rating indicates the collection system project site as “U” (urban), the rating assigned to developed communities, and a master productivity rating of “D 129” (poor) for the proposed wastewater treatment and disposal facility at Site 7. D 129 includes soils from the Māmalahoa series, deep depth, volcanic ash, stony, well drained, and very poorly suited for machine tillability.

The ALISH map shows the collection system is located in “unclassified” lands. The ALISH map shows the proposed wastewater treatment and disposal facility at Site 7 would be located on approximately 20 percent “prime”, 40 percent “other” and 40 percent “unclassified” land.

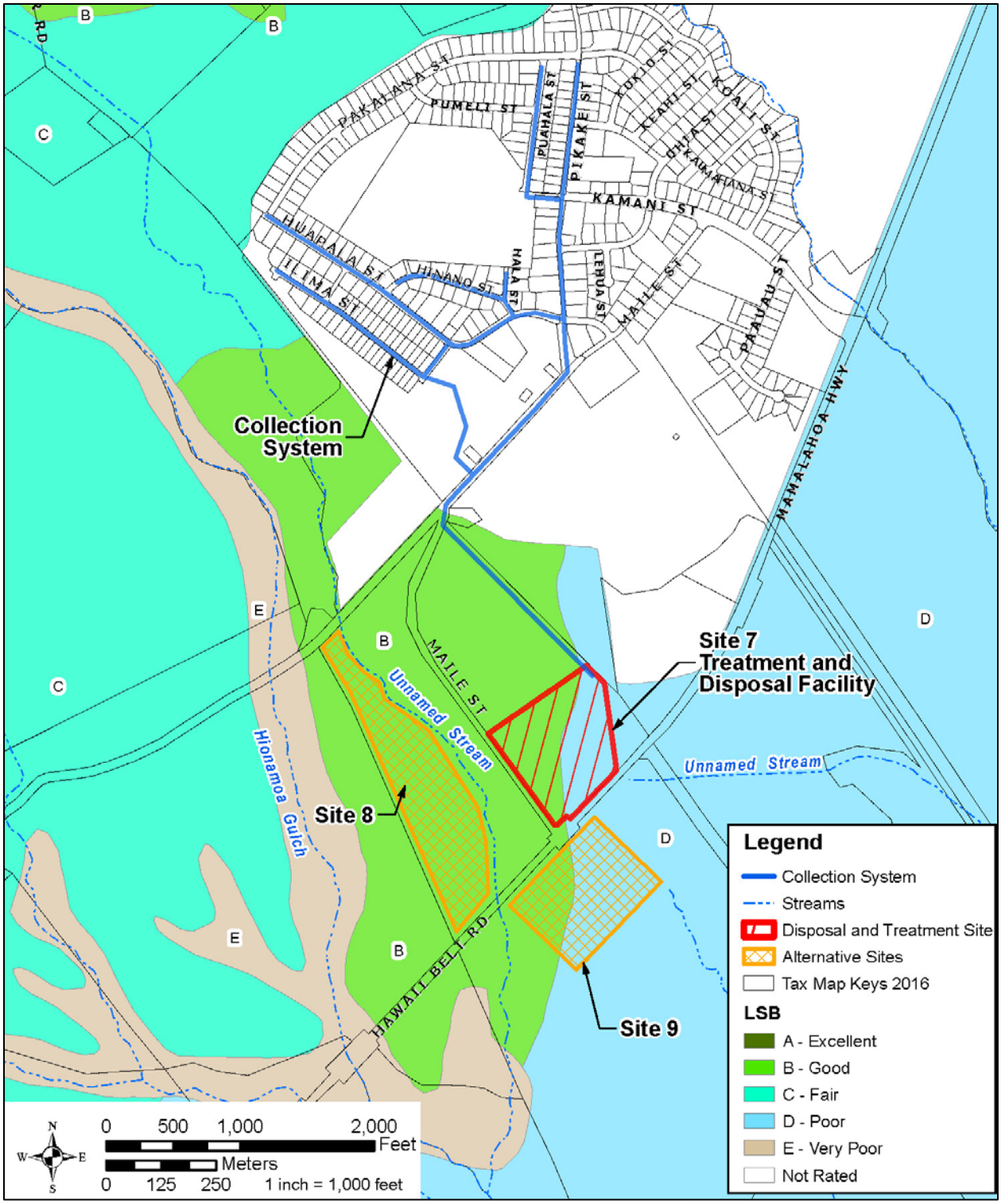


Figure 3.2. Pāhala Area Land Study Bureau (LSB) Ratings Map

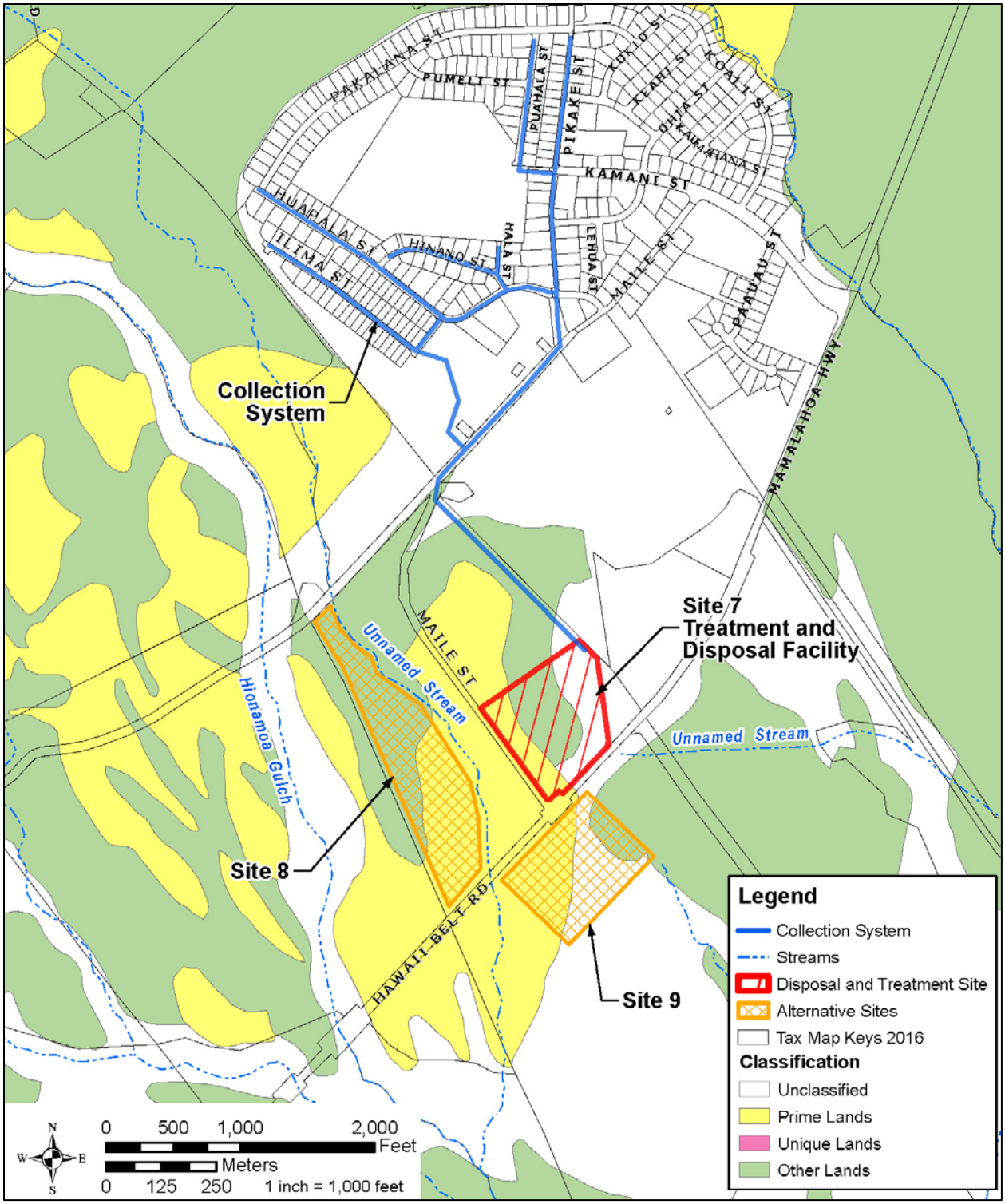


Figure 3.3. Pāhala Area Agricultural Lands of Importance to the State of Hawaiʻi (ALISH) Classification Map

(b) Alternative Site 8

Site 8 is located on a mix of "prime" and "other" agricultural land, with slightly more than 50 percent classified as "prime." There is no "unclassified" land at Site 8. Depending on the selected site plan, the land application groves would potentially be located on land classified as "prime."

(c) Alternative Site 9

Site 9 is made up primarily of "unclassified" land, with sections of both "prime" land (northwest corner of the parcel) and "other" land (northeast and southwest edges of the parcel). The proposed facility would likely be sited at the northern end of Site 9, on land that is a mix of "unclassified" and "prime" land.

3.10.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7)

Construction of the collection system within the County roads would not affect agricultural lands or the acreage utilized for the macadamia nut orchard. Construction of the wastewater treatment and disposal facility at Site 7 would require removal of approximately 14.9 acres of macadamia nut trees. This removal would amount to less than 0.1 percent of the total County lands planted with macadamia nut trees, which would not substantially affect the total macadamia nut acreage in the state or the County.

Abandonment of the two LCCs would reduce the potential for contamination of ground water that is used for irrigation of agricultural lands. Otherwise, Abandonment of the LCCs and the existing wastewater collection system would not affect agricultural lands within the affected areas.

(b) Alternative Site 8

As discussed above, construction of the collection system within the County roads would not affect agricultural lands or the acreage utilized for the macadamia nut orchard. Construction of the wastewater treatment and disposal facility at Site 8 would require removal of approximately 18.9 acres of macadamia nut trees, which would not substantially affect the total macadamia nut acreage in the state or the County.

Under Chapter 205, HRS, use of agricultural lands for non-agricultural purposes greater than 15.0 acres requires approval of a Special Permit by the Land Use Commission. The approval process involves a contested case public hearing before the Land Use Commission requiring attorneys and sworn testimony by witnesses from both the applicant, the County, and interveners. This entire process is considered quasi-judicial and would require at least 12 to 18 months to complete. The time required for the discretionary Special Permit approval would make it difficult for Site 8 to meet the conditions of the AOC.

(c) Alternative Site 9

As discussed above, construction of the collection system within the County roads would not affect agricultural lands or the acreage utilized for the macadamia nut orchard. Construction of the wastewater treatment and disposal facility at Site 9 would require removal of approximately 14.9 acres of macadamia nut trees, which would not substantially affect the total macadamia nut acreage in the state or the County.

(d) No-Action Alternative

The No-Action Alternative would not impact agricultural lands. Continued operation of the existing LCCs could introduce pathogens and other contaminants to ground water that is used for irrigation of agricultural lands.

3.11 Solid and Hazardous Waste

3.11.1 Existing Conditions

(a) All Alternative Sites

In July 2017, a Phase 1 Environmental Site Assessment (ESA) was prepared for the County of Hawaiʻi in accordance with best practices and the requirements presented in the American Society for Testing and Materials (ASTM) Standard Practice E 1527-13 (ASTM E 1527-13). The Phase 1 ESA was conducted on the entire 42.5-acre parcel comprising Site 7 (preferred alternative), including the 14.9-acre location for the proposed treatment and disposal facility. Details on the Phase 1 ESA objectives and guidelines can be found by reviewing ASTM E 1527-13.

A review was conducted of standard environmental (regulatory) records and specified historical records covering Site 7. A review of historical aerial photographs (1972, 1977, 1985, 1992 and 2001) identified no recognized environmental concerns (RECs). The site was identified as sugar cane land from 1972 to 1977 and was converted to a macadamia nut orchard by 1985.

The surrounding area, including Sites 8 and 9, consisted primarily of sugar cane and vacant land prior to use for macadamia nut production. No properties adjacent to Site 7 had a historical use that would represent a REC.

The Phase 1 ESA concluded no further assessment of the Site 7 parcel and proposed project site for RECs is recommended at this time. While no Phase 1 ESA was conducted for Sites 8 and 9, similar results to those for Site 7 might be expected given their similar historical and current uses.

3.11.2 Impacts and Mitigation Measures

(a) All Alternative Sites

Construction activities would involve the use of equipment containing fuel and other petroleum products that could be hazardous if released. Construction contract documents would require that a Site-Specific Construction Best Management Practices (BMP) plan be prepared, and that materials and equipment to clean up leaks or spills be kept on the project site during construction. In addition, contract documents would include specifications for weekly inspections and reports to ensure the construction activities comply with BMPs. These measures would mitigate adverse impacts to the project site and surrounding area from potential releases of these materials.

The proposed wastewater treatment and disposal facility would have an emergency generator that would use diesel fuel stored in an above-ground double-walled, concrete encased tank. A leak from the inner tanks would be contained in the interstitial space between the walls of the tank. Tanks of this nature are equipped with a monitor system to detect leaks in the inner wall. It is expected that at least a 250-gallon fuel capacity would be required to provide the desired 3-day backup supply of fuel for the proposed project. According to EPA, above-ground double-walled concrete tanks do not require an additional secondary spill containment system around its base. The fuel tank design would incorporate overfill prevention features to minimize potential spills.

With the exception of the emergency generator fuel, the only material used for the Proposed Action that could be classified as hazardous waste would be the calcium hypochlorite used to disinfect the effluent before it is used in the planted groves. Calcium hypochlorite is a solid form of chlorine commonly used in tablet or granular form. It would be transported and stored in manufacturer packaging typically consisting of sealed plastic tubs. The solid calcium hypochlorite would be dissolved to create a chlorine water solution (similar to household bleach) that is added to the effluent. The concentrations of chlorine in the effluent would not be at a level considered hazardous. Safe handling practices would be utilized to ensure proper disposal in the unlikely

case of there being any unused tablets/pellets/granular calcium hypochlorite, and the unused material would stored indoors and kept dry and away from contact with other chemicals.

Ongoing operation of the proposed collection system and treatment and disposal facility is not expected to result in the creation of any hazardous waste on a regular basis.

The lagoons would need to be cleaned of sludge approximately every 20 years, and the material removed at that point would be substantially degraded from biological activity. Municipal sewage sludge is typically not considered a hazardous waste, and the material would be tested prior to end use or disposal to verify compliance with applicable requirements. The sludge removed from the facility could be landfilled, composted, or applied to land as a soil amendment and fertilizer in accordance with state and Federal requirements.

The Proposed Action includes closure of existing LCCs in Pāhala. LCCs are considered underground injection wells and are regulated by EPA and the State of Hawaiʻi DOH's UIC rules. Under the Proposed Action, the existing LCCs are considered waste management units and would be closed in accordance with DOH UIC regulations.

Abandonment of the existing wastewater collection system would not result in the generation of solid or hazardous waste. Any sanitary wastewater remaining in the existing collection system would be diverted to the new collection system prior to closure.

(b) No-Action Alternative

The No-Action Alternative would maintain the existing LCCs in Pāhala. Under State DOH rules, LCCs are considered waste management wells and are regulated by the DOH UIC program. Ongoing operation of LCCs is no longer allowed by EPA and their closure is mandated.

3.12 Flora

3.12.1 Existing Conditions

(a) All Alternative Sites

In August 2018, a botanical field study was undertaken along the streets and areas adjacent to the proposed wastewater collection system and at the preferred location (Site 7) for the proposed wastewater treatment and disposal facility. Botanical field studies were not conducted for Site 8 or Site 9; however, similar results to those for Site 7 might be expected since these sites are also currently used for macadamia nut production.

The area surveyed for the proposed collection system is along existing roadways within Pāhala. The survey in these areas indicated the vegetation to be composed of maintained yards with ornamental plants.

The field survey for the proposed 14.9-acre wastewater treatment and disposal facility at Site 7 indicated 52 species of vascular plants: two ferns, one gymnosperm, and 49 species of angiosperms (flowering plants). Only two species (*Ipomoea indica* and *Waltheria indica*, 4 percent of the total number of observed species) are regarded as native to the Hawaiian Islands and both are indigenous (native, but also distributed elsewhere in the Pacific). Being widely distributed indigenous species, neither is listed as threatened, endangered, or of any special concern.

The field study indicated no species of plants currently listed or proposed for listing under either Federal or State of Hawaiʻi endangered species are present along the alignment for the proposed wastewater collection system and at the preferred site (Site 7) for the wastewater treatment and disposal facility. The field survey determined that Federally-delineated Critical Habitat is not present in the Pāhala area. No equivalent designation exists under State law in Hawaiʻi.

The macadamia nut orchard at Sites 7, 8, and 9 is a valuable commercial botanical resource but not an environmentally-sensitive one. Similarly, the Cook pines (*Araucaria columnaris*) that line Maile Street along the western border of Site 7 and elsewhere are considered an important part of the community landscape element.

3.12.2 Impacts and Mitigation Measures

(a) All Alternative Sites

Based on the results of the botanical field study, construction of the new collection system and new wastewater treatment and disposal facility is not likely to cause any adverse impacts on botanical species of importance in the Pāhala area and would not impact Federally-delineated Critical Habitat. The Cook pines (*Araucaria columnaris*) that line Maile Street along the western border of Site 7 and elsewhere would be retained.

On April 23, 2018, as part of the pre-assessment consultation process, the U.S. Fish and Wildlife Service (FWS) provided a letter (01EPIF00-2018-TA-0275) with recommended measures to avoid and minimize impacts to flora (see Appendix A). Prior to finalization of this EA and initiation of the Proposed Action, EPA and the County of Hawaiʻi will conclude consultation with FWS in accordance with Section 7 of the Endangered Species Act and, if necessary per this consultation, will incorporate additional impact avoidance and minimization measures.

Abandonment of the two LCCs and the existing wastewater collection system would not affect flora within the affected areas.

(b) No-Action Alternative

The No-Action Alternative includes no modifications to the existing LCC system, and therefore would not impact flora.

3.13 Fauna

3.13.1 Existing Conditions

(a) All Alternative Sites

Mammalian Survey:

In August 2018, a biological field survey was conducted for mammalian species at the preferred site (Site 7). With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or ōpeʻapeʻa as it is known locally, all terrestrial mammals currently found on the Island of Hawaiʻi are alien species, and most are ubiquitous. The biological survey was limited to visual and auditory detection coupled with visual observation of scat, tracks, and other animal signs. The survey identified no mammalian species within the survey area at Site 7. There was also no indication that pigs (*Sus scrofa*) utilize the survey area, despite reports from the community that the area is occasionally used for hunting. The biological survey report is included as Appendix C.

Biological field surveys were not conducted for Site 8 or Site 9; however, similar results to those for Site 7 might be expected since these sites are also currently used for macadamia nut production.

Avian Survey:

The biological field survey conducted in August 2018 also identified avian species in the Site 7 area. Six avian count stations were sited roughly equidistant from each other; two were placed along the proposed wastewater collection system alignment and four were placed within the proposed location for the 14.9-acre wastewater treatment and disposal facility at Site 7.

The avian survey found a total of 175 individual birds of 13 species representing nine separate families. Avian diversity and densities were very low, which is consistent with the current site use as a mature macadamia nut orchard with limited ground cover and few weedy or shrubby species. All of the recorded avian species are established alien species. No native avian species were recorded during this survey of Site 7. Biological field surveys were not conducted for Site 8 or Site 9; however, similar results to those for Site 7 might be expected since these sites are also currently used for macadamia nut production.

The findings of the avian survey are consistent with the location of Site 7 (and Sites 8 and 9) and the monoculture of macadamia nut trees present at all sites. The field survey report indicated that endemic Hawaiian Petrel (*Pterodroma sandwichensis*) and Newell's Shearwater (*Puffinus newelli*) have been recorded flying over the general area between April and the end of November each year. The petrel is listed as endangered and the shearwater as threatened under both Federal and State endangered species statutes. As discussed in the August 2018 report, these seabirds are susceptible to impacts from outdoor lighting, which can result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable.

3.13.2 Impacts and Mitigation Measures

(a) <u>All Alternative Sites</u>

The field survey recorded no species of animals currently listed or proposed for listing under either the Federal or State endangered species statutes. The preliminary proposed site plan shows no new infrastructure constructed above the existing tree line that could present a hazard to waterbirds.

The operations building at the proposed wastewater treatment and disposal facility would include down-shielded light fixtures mounted below the roof overhang. The light fixtures near the headworks would also be down-shielded. These lights would be used only in the event of an emergency at night. All fixtures would meet requirements for outdoor lighting as set forth in Hawaiʻi Code Chapter 14 (General Welfare). These measures would help avoid or minimize any potential adverse impacts to the Hawaiian Petrel and Newell's Shearwater.

After construction of the wastewater treatment and disposal facility is completed, the new lagoons would potentially attract various species of waterbirds, including the listed Hawaiian Coot (*Fulica alai*), the endemic sub-species of the black-necked stilt (*Himantopus mexicanus knudseni*), and nēnē. Experience at other County wastewater facilities with aerated lagoons (e.g., the Kealakehe wastewater treatment plant) has demonstrated that the aerated lagoon wastewater treatment process can present a highly attractive breeding area for local bird species.

On April 23, 2018, as part of the pre-assessment consultation process, the FWS provided a letter (01EPIF00-2018-TA-0275) with information on various avoidance and minimization measures to avoid adverse impacts to listed species (see Appendix A). The letter included measures for the Hawaiian hoary bat, the Hawaiian hawk, and nēnē. FWS also recommended further consultation to determine whether the lagoons, despite their potential attractiveness to nesting seabirds, could represent a sub-optimal breeding environment. Prior to finalization of this EA and initiation of the Proposed Action, EPA and the County of Hawaiʻi will conclude consultation with FWS in accordance with Section 7 of the Endangered Species Act and will incorporate additional impact

avoidance and minimization measures as necessary to result in a finding of Not Likely to Adversely Affect (NLAA) protected species.

Abandonment of the two LCCs and the existing wastewater collection system would not affect fauna within the affected areas.

(b) No-Action Alternative

The No-Action Alternative includes no modifications to the existing LCC system, and therefore would not be likely to impact fauna.

3.14 Air Quality

3.14.1 Existing Conditions

(a) All Alternative Sites

Ambient air quality standards (AAQS) have been established at both the national (NAAQS) and state level for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter (PM_{10} and $PM_{2.5}$). The State has also set a standard for hydrogen sulfide. Hawaiʻi ambient air quality standards are comparable to the national standards, although in some cases the Hawaiʻi standards are more stringent than the national standards, such as for carbon monoxide. For some other parameters, such as particulate matter, the national standards are more restrictive.

The DOH operates a network of air quality monitoring stations at various locations around the State. In December 2016, the DOH issued the Annual Summary 2015 Air Quality Data report (the most recent report) which provides the results from the network of air quality monitoring stations. The DOH maintains a monitoring station at the Kaʻū High School and Pāhala Elementary School. Established August 2007, the station was placed to monitor SO_2 and $PM_{2.5}$ from volcanic emissions. Criteria pollutant levels remain below Federal and State ambient air quality standards throughout the State.

Existing air quality in the project area is affected mostly by air pollutants from vehicular, industrial, natural and/or agricultural activities and processes. Also, volcanic emissions affect air quality on the Island of Hawaiʻi more than the other islands in the State. Since 1983, volcanic emissions from eruptions of Kīlauea Volcano have periodically affected the project area.

A recent analysis by the USGS shows the composition of volcanic smog (vog) depends on how much time the volcanic plume has had to react with the atmosphere. In areas closer to the volcano, such as Pāhala, vog contains both aerosols and unreacted sulfur dioxide (SO_2) gas. SO_2 gas is colorless and invisible, but the tiny particles in vog create a visible light-colored haze by scattering sunlight and thus reduce visibility.

Vog concentrations on the Island are primarily dependent on the amount of SO_2 emitted from Kīlauea, the distance from the source vents, and the wind direction and speed on a given day. From May through September, the main wind direction in the Hawaiian Islands is from the northeast (trade winds) which occur about 80 to 95 percent of the time. Under trade wind conditions, vog travels around the southern part of the island. Most of the vog stays below 6,000 to 8,000 feet above msl, the usual height of the trade wind inversion. This layer of the atmosphere increases in temperature with altitude, inhibiting the rise of cooler, vog-laden air. When trade winds are absent, which occurs most often during winter months, the entire Island, or even the entire State can be affected by vog.

Volcanic eruptions are considered natural events and therefore EPA may exclude the exceedances of the 1-hour NAAQS from attainment determinations.

Consistent with its rural nature, the Pāhala area has no major stationary sources of air pollution. Further, the low level of vehicle traffic on Māmalahoa Highway and on the streets in the community limit mobile sources of emissions.

3.14.2 Impacts and Mitigation Measures

(a) All Alternative Sites

Short-term impacts on air quality could occur during construction of the proposed wastewater collection system and the wastewater treatment and disposal facility. Short-term impacts from fugitive dust emissions would likely occur during the construction phases. To a lesser extent, exhaust emissions from mobile construction equipment, traffic disruption associated with wastewater collection system construction, and from workers commuting to the construction site may also affect air quality during the period of construction. State HAR, Title 11, Chapter 60-11.1 "Air Pollution Control," requires that there be no visible fugitive dust emissions at the property line. Hence, an effective dust control plan would be implemented to ensure compliance with State regulations. During construction, fugitive dust emissions would be controlled to a large extent by watering of active work areas, the use of wind screens, keeping adjacent paved roads clean, and by covering open-bodied trucks. Other dust control measures may include limiting the area that can be disturbed at any given time and/or mulching or chemically stabilizing areas where construction is not actively occurring. These dust control measures would be most applicable to construction activities at the wastewater treatment and disposal facility project site.

After construction, motor vehicle traffic from County employees and others visiting the treatment and disposal facility project site would be a minor source of increased air pollutant emissions. As discussed in Section 3.17 (Traffic), management of the facility requires weekly visits by a single operator based in Hilo and any intermittent visits for maintenance purposes. Given the low ambient levels of pollutants and infrequent visits to the facility, any increases would not result in exceedance of federal or State AAQS for the six criteria pollutants.

The treatment and disposal facility would have an emergency standby diesel-powered generator for use during periods of outage of the commercial electrical service. The generator would also be operated periodically for testing to ensure proper operation. The operation and testing should not cause an exceedance of air quality standards.

Wastewater treatment plants can be a source of nuisance odors to the surrounding community if not properly designed or operated. Typically, nuisance odors are most commonly associated with anaerobic (without oxygen) conditions and with processing of residual solids. Incoming raw sewage flows to the proposed wastewater treatment and disposal facility would first be routed to the headworks, which is the facility where the solids are removed from the flows.

To mitigate potential nuisance odors, the headworks would be equipped with an odor control system with a GAC scrubber to remove odor. A package GAC scrubber passes the odorous air through a bed of activated carbon, which adsorbs the odorous constituents within the pore spaces of the carbon. The County currently operates GAC scrubbers at other facilities, and it has been proven to be an effective means of odor control both locally and nationwide. The treatment lagoons would be equipped with mechanical aerators capable of maintaining sufficiently aerobic (with oxygen) conditions within the water column, which would prevent nuisance odor conditions from occurring. The disposal groves would be irrigated with fully-treated and aerobic secondary effluent from the treatment process; irrigation with secondary effluent is not associated with development of nuisance odor conditions.

Overall, construction and operation of the wastewater collection system and treatment and disposal facility would not likely result in significant impacts to air quality of the Pāhala area. Mitigation measures would be implemented, as appropriate, to minimize any potential impacts.

Abandonment of the two LCCs and the existing wastewater collection system would not affect air quality within the Pāhala area.

(b) No-Action Alternative

The No-Action Alternative includes no modifications to the current LCC system, and therefore is not likely to impact ambient air quality in the Pāhala area. Historically, air quality in the Pāhala area has met ambient standards during operation of the LCCs.

3.15 Archaeological and Cultural Resources

3.15.1 Existing Conditions

(a) Preferred Alternative (Site 7)

A survey of available information identified the presence of one historic site in the immediate vicinity of the proposed wastewater collection system. In Pāhala, the Kaʻū High and Pāhala Elementary School is listed on the State of Hawaiʻi register of historic places. No other historic sites were identified within the areas planned for improvements.

In November 2016, as part of the initial planning for LCC closure, the County contracted for a 1-day archaeological field inspection of Site 7, including the preferred location for the proposed wastewater treatment and disposal facility. The purpose of the inspection, which involved pedestrian sweeps of the entire 42.5-acre parcel, was to determine if any historic properties or significant archaeological features were present. The inspection report stated that it is apparent that ground modifications undertaken during the plantation period destroyed any evidence of pre-contact agriculture or settlement activities. Furthermore, bulldozing associated with the creation of the macadamia nut orchard appears to have leveled any plantation-era land features.

The 2016 inspection identified surface artifacts as the only evidence of past human activity on Site 7. Artifacts included a single traditional artifact as well as more numerous late post-contact artifacts. The single traditional artifact was a crudely-shaped discoidal hammerstone found on the ground surface near the northern edge of Site 7 near Maile Street. No other cultural material (either traditional or post-contact) was observed in this area, suggesting that the hammerstone reflects an isolated artifact rather than a buried cultural deposit. Given the possible agricultural activity that may have taken place in the region during the pre-contact period, it is not surprising that a traditional artifact was found within the inspection parcel.

While the historical ground modifications have likely limited the archaeological potential of the site, the discovery of both pre- and post-contact surface artifacts within the 42.5-acre Site 7 parcel, as well as evidence from plantation-era documents that the opening of a lava tube containing human remains once existed in the southeastern corner of the parcel, indicate that further archaeological studies may be necessary by the Hawaiʻi State Historic Preservation Division (SHPD) before any development can be initiated. The 2016 inventory report stated that, at minimum, an Archaeological Inventory Survey (AIS) was necessary to fully document, map, date and collect the surface artifacts. It may also be necessary to test for the presence of subsurface cultural deposits through hand excavation or mechanical trenching.

As part of this EA, the County is undertaking an AIS of the preferred location for the proposed 14.9-acre treatment and disposal facility, including subsurface testing within the proposed sites for the lagoons and land application groves. To conduct an AIS, SHPD must approve an AIS plan within a 30-day period. To meet this requirement, the County submitted the AIS plan to SHPD on March 22, 2018. On April 25, 2018, SHPD requested clarification. Responses were submitted to SHPD on July 31, 2018 including the findings from the 2016 field survey report and a map of the proposed wastewater treatment and disposal facility. The map showed that the preferred site for the facility would avoid the area in which the traditional artifact was found during the 2016

inventory. SHPD approved the AIS plan on August 20, 2018, and the County intends to perform the AIS of the preferred location in September 2018.

In addition to an AIS, the County is required to comply with the National Historic Preservation Act (NHPA). On March 29, 2018, the County initiated consultation for this project pursuant to Section 106 of the NHPA. Consultation letters were delivered to invite comments from organizations that may attach religious or cultural significance to properties affected by the Proposed Action. A total of 15 letters were mailed to various Native Hawaiian Organizations requesting comments (see Chapter 10); as of August 2018, no responses have been submitted to the County.

(b) Alternative Sites 8 and 9

Alternative Sites 8 and 9 have similar existing conditions for historical resources as presented above. Although Sites 8 and 9 were not surveyed, they are both currently used as macadamia nut orchards and thus would be expected to exhibit similar ground modifications as Site 7. The ground modifications from the plantation period would have destroyed any evidence of pre-contact agriculture or settlement activities, in addition to extensive disturbance from bulldozing during creation of the macadamia nut orchard.

3.15.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7)

Preliminary analysis at Site 7 indicates that the proposed wastewater treatment and disposal facility would be constructed in an area that does not contain archaeological resources. An AIS, including subsurface testing, is being conducted to confirm the presence or absence of resources on the 14.9-acre proposed wastewater treatment and disposal facility site.

The construction contract documents would state that, should archaeological sites such as walls, platforms, pavement or mounds, or remains such as artifacts, burial sites, concentrations of shells or charcoal, be encountered during construction activities, work shall cease immediately and the find shall be protected from further damage. The contractor would immediately contact SHPD (at 808.981.2979), who would assess the significance of the find and recommend appropriate mitigation measures, if necessary.

Prior to finalization of this EA and initiation of the Proposed Action, EPA and the County of Hawaiʻi will conclude consultation with SHPD in accordance with Section 106 of the NHPA and will incorporate additional impact avoidance and minimization measures as necessary to result in a finding of no adverse effects to historic properties.

Abandonment of the two LCCs and the existing wastewater collection system would not affect archaeological and cultural resources within the affected areas.

(b) Alternative Sites 8 and 9

Under these alternatives, the potential impacts to archaeological and cultural resources and the necessary impact avoidance and minimization measures would likely be similar to those described above for the Preferred Alternative (Site 7). If Site 8 or Site 9 are selected for development, an AIS, including subsurface testing, would be conducted to confirm the presence or absence of resources on the proposed wastewater treatment and disposal facility site. If archaeological sites are discovered during construction, work would cease and SHPD would be contacted (at 808.981.2979) to determine appropriate mitigation measures, if necessary. EPA and the County of Hawaiʻi would consult with SHPD in accordance with Section 106 of the NHPA and would incorporate impact avoidance and minimization measures as necessary to result in a finding of no adverse effects to historic properties.

(c) No-Action Alternative

The No-Action Alternative would not result in any disturbance to land within the Pāhala area and is therefore not expected to have any adverse impacts on archaeological or cultural resources.

3.16 Socioeconomic Characteristics

3.16.1 Existing Conditions

(a) All Alternative Sites

In March 2017, the State of Hawaiʻi Department of Business, Economic Development and Tourism released 2016 population estimates for the state and counties. This analysis estimates that Hawaiʻi County had a resident population of 198,449 persons in 2016, which represents an annual increase of 1.2 percent from 2010.

The U.S. Census Bureau provides the American Community Survey (ACS), which updates selected demographic, social, and economic information for various years. This includes age, racial composition, and economic information, including employment and household income by Census Designated Place for several locations in Hawaiʻi County. The most recent version of the ACS is the 2012-2016 5-Year Estimates, released in 2017. See Table 3.1 below.

The ACS shows the Pāhala population has a similar age distribution to Hawaiʻi County, although Pāhala has a higher portion of individuals in the "Under 5 to 19" age category, 28.5 percent compared to 24.4 percent for the County. The median age for Pāhala is 42.4 years compared to 41.8 years for the County.

Overall, Pāhala is characterized by a racial composition that includes a greater proportion of minorities than the County at large. The racial distribution includes a much lower proportion of White residents, a much higher proportion of Filipino residents, and lower populations of other minority groups, including Native Hawaiians when compared to the County. There are also more residents of two or more races in Pāhala than in the County.

Pāhala has a higher proportion of residents that have completed high school and some college than the County overall, but a lower proportion with college degrees (bachelor's and graduate or professional degrees). From an economic perspective, Pāhala generally has more households in lower income brackets than the County, and a lower median household income.

Lastly, Pāhala had a higher proportion of employment in agriculture, forestry, fishing, hunting, and construction (31.9 percent), and in education and health care (22.1 percent), compared to the County (12.6 percent and 19.7 percent, respectively).

A subset of social resources is environmental justice. Environmental justice considers sensitive populations, such as children, minorities, and low-income communities. Sensitive populations are identified in two Executive Orders (EOs):

- EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, serves to avoid the disproportionate placement of adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations.
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that federal agencies will identify and address environmental health and safety risks from their activities, policies, or programs that may disproportionately affect children.

Sensitive populations, such as low-income families, minorities, and children, are present within the Pāhala area. Areas within the community have sensitive populations with higher minority and low-income populations than the state averages.

Table 3.1
Demographic, Economic and Social Characteristics of Pāhala and Hawaiʻi County

Item	Pāhala		Hawaiʻi County	
	Total	Percent	Total	Percent
Demographic Characteristics				
Total population	1,341	-----	193,680	-----
Under 5 to 19 years	383	28.5	47,195	24.40
20 to 34 years	192	14.3	34,623	17.8
35 to 59 years	305	22.7	61,809	31.9
60 to 74 years	367	27.4	36,863	19.1
75 years and over	94	7.1	13,190	6.8
Median age	42.4	-----	41.8	-----
Race				
White	106	7.9	64,255	33.2
African American (incl. American Indian/Alaska Native)	0	0.0	1,213	0.6
Chinese	10	0.7	1,844	1.0
Filipino	484	36.1	17,794	9.2
Japanese	54	4.0	17,981	9.3
Other Asian	46	3.4	3,722	1.9
Native Hawaiian	50	3.7	20,980	10.8
Other Pacific Islander	18	1.3	4,725	2.4
Some other race	1	0.1	3,230	1.7
2 or more races	572	42.7	54,564	28.2
Social Characteristics				
Less than 9th grade	98	10.9	3,681	2.7
High school to HS graduate	489	54.5	50,586	37.3
Some college to associate degree	204	22.7	43,761	32.3
Bachelor's degree	97	10.8	24,704	18.2
Graduate or professional degree	10	1.1	12,649	9.3
Household Income Characteristics				
Less than $24,999	130	33.7	17,337	26.3
$25,000 to 49,999	73	18.9	13,655	20.6
$50,000 to $99,999	126	32.6	20,323	30.7
$100,000 to $199,999	48	12.4	12,201	18.5
$200,000 or more	10	2.6	2,563	3.9
Median household income	$47,625	-----	$53,936	-----
Employment Characteristics				
Agriculture, forestry, fishing and hunting	120	26.2	3,713	4.4
Construction	26	5.7	6,806	8.2
Manufacturing and wholesale-trade	0	0	3,701	4.5
Retail trade	16	3.5	10,858	13.0
Transportation, warehousing, and utilities	14	3.1	4,250	5.1
Information tech, finance, insurance, and real estate	9	2.0	5,677	6.8
Professional, scientific, and technical services	0	0	3,736	-----
Education and health care	101	22.1	16,437	19.7
Arts, entertainment, recreation	0	0	2,466	-----
Other services, public administration	49	10.7	10,015	12.0

Source: 2012-2016 American Community Survey (5-Year Estimates) Hawaiʻi Geographic Area Profiles – Census Designated Places: Neighbor Islands.

3.16.2 Impacts and Mitigation Measures

(a) All Alternative Sites

In the short term, construction projects under the Proposed Action would require a number of contractors and their subcontractors. Construction contract documents would reference HRS 103B, which requires the contractor (including subcontractors) to include not less than 80 percent Hawaiʻi residents in the work force. This would limit the importation of workers from outside the local area and the associated increase in demand for local housing.

The Proposed Action would generate employment as the contractor would need workers to undertake construction of the improvements for the wastewater collection system and the wastewater treatment and disposal facility. This employment would generate wages and salaries paid to the contractor and subcontractor work forces. The wages and salaries paid to the work force would in turn generate purchases of goods and services, which would result in taxes paid to the State of Hawaiʻi. In addition, the contractor and their subcontractors would need to purchase equipment, supplies, and materials, some of which would be purchased from local suppliers and vendors. Direct purchases of equipment, supplies, and materials by the contractor would also generate taxes. Overall, the Proposed Action would result in positive employment benefits which would result in higher levels of income and overall economic benefits to the local economy.

Despite the relatively low household income in Pāhala compared to the County overall, the Proposed Action is not expected to result in disproportionate impacts on sensitive populations. The proposed wastewater treatment and disposal facility would be located more than two miles from homes in Pāhala and is not designed to encourage or accommodate substantial population growth. Noise, odor, and other adverse impacts of the Proposed Action would not disproportionately impact lower-income residents of Pāhala. Overall, the Proposed Action is expected to benefit residents by providing a cleaner and longer-lasting wastewater treatment system.

The Proposed Action is not likely to directly impact long-term employment or education trends because the wastewater operator would likely be based in Hilo, meaning the project would not involve long-term relocation of any staff to Pāhala.

Abandonment of the two LCCs, which do not require substantial maintenance and operation, and Abandonment of the existing wastewater collection system would have no impact on socioeconomic resources within Pāhala.

(b) No-Action Alternative

The No-Action Alternative includes no modifications to the current sewage system, and therefore is not expected to impact socioeconomic or demographic conditions in the Pāhala area.

3.17 Traffic

3.17.1 Existing Conditions

(a) All Alternative Sites

Māmalahoa Highway (State Highway Route 11) is the major north-south roadway for the Pāhala area. This minor arterial highway provides two lanes, one lane in each direction, and shoulders within a 60-foot ROW. Pāhala is located about 51 miles south of Hilo and has two major access roads, Kamani Street on the northern end and Maile Street on the southern end.

In November 2010, State of Hawaiʻi Department of Transportation conducted the most recent traffic counts on Māmalahoa Highway at the Pāʻauʻau Bridge, mile marker 51.32, located just north of Kamani Street. The counts provide 24-hour and peak-hour counts for traffic in both

directions. The 24-hour period counts show a total two-way volume of 2,449 vehicles, with 1,212 vehicles southbound and 1,237 vehicles northbound. The peak morning hours occurred between 7:00am to 8:00am and had a total two-way volume of 186 vehicles with 108 vehicles southbound and 78 vehicles northbound. The peak afternoon hours occurred between 4:00pm to 5:00pm and had a two-way volume of 219 vehicles with 104 vehicles southbound and 115 vehicles northbound.

Within Pāhala, vehicle traffic primarily occurs on streets under the jurisdiction of the County of Hawaiʻi. The streets typically carry two-way traffic, one lane in each direction, within roadways with improved surfaces of 22 to 24 feet wide with no curbs and sidewalks. The shoulders consist mostly of grass swales which also serve to carry surface runoff along with the streets. These roadways carry vehicle traffic from adjacent and nearby residential areas. As a result, the traffic volumes are relatively low, which is consistent with traffic generation by a rural community.

The wastewater collection system and the wastewater treatment and disposal project site are located outside of the Māmalohoa Highway ROW.

3.17.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7) and Alternative Site 8

Under these two alternatives, the wastewater collection system and the wastewater treatment and disposal facility would be located outside of the Māmalahoa Highway ROW and would not require any disturbance or other impacts within the Māmalahoa Highway ROW.

Work on the collection system would require excavation of open trenches in road ROWs. The contractor would be required to prepare traffic control plans in the area of each open trench site that provide procedures for controlling traffic in the work area, including the placement of signs, traffic delineators or barriers, lane closures, flaggers to direct traffic, and special duty officers to oversee conditions at the site. The traffic control plans would provide directions to temporarily divert traffic or close travel lanes during the construction period. Normally, such plans call for these diversions or closures during non-peak travel times to minimize disruptions to traffic flow. When not in use, trenches would be covered with steel plates or surrounded by traffic barriers to prevent accidents. The County would be required to approve any traffic control plans.

Construction of the proposed treatment and disposal facility would require transport of construction equipment and supplies to the construction site, including excavators and other heavy equipment. Deliveries to the construction site could require temporary stoppage of traffic on Maile Street to safely unload equipment and supplies. To minimize traffic disruptions, contractors typically try to conduct these activities during off-peak traffic hours.

The wastewater treatment and disposal facility would require only weekly visits by a single operator based in Hilo and intermittent visits for maintenance purposes. As such, no impacts to traffic are expected from wastewater treatment and disposal facility staff. Sludge removal would occur approximately every 20 years, so no impacts to traffic are expected due to truck activity associated with sludge removal.

Abandonment of the two LCCs and the existing wastewater collection system would not affect transportation within the Pāhala area.

(b) Alternative Site 9

Transportation impacts under this alternative would be identical to those for the Preferred Alternative (Site 7) and Site 8, except it would require construction of piping and other utilities within the Māmalahoa Highway ROW to provide connections to the new wastewater treatment and disposal facility in Site 9. This would require obtaining an easement from the State of Hawaiʻi for work within the highway ROW and could delay the start of construction.

(c) No Action Alternative

The No-Action Alternative would not impact traffic in the Pāhala area because no modifications to the current system would be made.

3.18 Noise

3.18.1 Existing Conditions

(a) All Alternative Sites

The A-weighted decibel scale (dBA) is a logarithmic scale generally used to measure noise levels because it can account for the sensitivity of the human ear across the frequency spectrum. The Occupational Safety and Health Administration (OSHA) regulates workplace noise with standards for two different types of noise: constant and impulse. The OSHA limit for constant noise is 90 dBA for eight hours; however, the National Institute for Occupational Safety and Health recommends a constant noise limit of 85 dBA for eight hours to minimize hearing loss induced by occupational noise. The OSHA maximum sound level for impulse noise is 140 dBA. In areas where workplace noise exceeds these sound levels, employers must provide workers with personal protective equipment to reduce noise exposure.

HAR Title 11 Department of Health Chapter 46, Community Noise Control, sets forth various maximum noise limits by zoning districts or land uses. According to Chapter 46, §11-46-3 and §11-46-4: Class A zoning districts include all areas equivalent to lands zoned as residential, conservation, preservation, public space, open space, or similar type. Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type. Class C zoning districts include all areas equivalent to lands zoned agriculture, country, industrial, or similar type.

All alternative sites for the proposed wastewater treatment and disposal facility are in Class C zoning districts. The proposed wastewater collection system would primarily be located in Class A zoning districts. The maximum permissible sound levels in each zoning district are presented below in Table 3.2 and apply to stationary noise sources and equipment related to agricultural, construction, industrial activities.

Table 3.2
Permissible Sound Levels by Zoning District

Zoning District	Daytime: 7am to 10pm	Nighttime: 10pm to 7am
Class A	55 dBA	45 dBA
Class B	60 dBA	50 dBA
Class C	70 dBA	70 dBA

According to HAR Chapter §11-46-5, Exemptions (4), the operation of emergency generators can be exempted if they are installed and used as required for the purpose of protecting public health and safety.

There are no current significant sources of noise impacting the proposed project areas. The proposed wastewater treatment and disposal facility would be located in active macadamia nut orchards where the primary source of noise is ongoing orchard operations. The proposed wastewater collection system would primarily be located in residential areas with background noise levels typical of a residential zone.

3.18.2 Impacts and Mitigation Measures

(a) All Alternative Sites

In the short term, noise levels would increase in the Pāhala area due to construction activities along the wastewater collection system and at the site of the proposed wastewater treatment and disposal facility. Noise is expected to be intermittent and unavoidable because construction vehicles and heavy equipment generate noise as part of normal operations. Mitigation of noise from construction activities to inaudible levels is not practical in all cases due to the intensity and exterior nature of the work.

Construction activities for the Proposed Action would need to comply with provisions of HAR Title 11, Chapter 46, Community Noise Control. These regulations require a noise permit if the noise level from construction is expected to exceed allowable levels as stated in Chapter 11-46. Construction contractors are responsible for minimizing noise by properly maintaining mufflers and other noise-attenuating equipment and to maintain noise levels within regulatory limits. The construction contractor would obtain appropriate permits or approvals for the Proposed Action. Potential noise impacts would be mitigated somewhat because the majority of construction activity would occur during daytime hours.

Depending on the results of geotechnical surveys, construction of the wastewater treatment and disposal facility could involve excavation to a depth that would require removal of bedrock. If necessary, this would likely be accomplished by using backhoe-mounted hydraulic and/or pneumatic hammers to break up the bedrock for removal, resulting in temporarily elevated impulse noise levels. This construction would occur only during daytime hours and is not expected to result in exceedances of the 70 dBA Class C zoning district noise threshold outside of the property boundary or in residential areas. Additionally, construction contract documents would require that workers are provided with, and wear, appropriate personal protective equipment to reduce noise exposure to below the OSHA maximum sound level.

After construction, the proposed wastewater treatment and disposal facility is not expected to be a significant source of additional ambient noise during routine operation. Operational noise would be confined to the aerators within the lagoons, emergency generator operation, and vehicle movements at the facility. Emergency generator operation would occur only during emergencies and periodic testing and thus would be infrequent. Best available control technology would be implemented to mitigate noise associated with emergency generator operation. Therefore, the Proposed Action is not likely to create an adverse impact to the noise environment in the Pāhala area.

Abandonment of the two LCCs and the existing wastewater collection system would not affect the noise environment in the Pāhala area.

(b) No-Action Alternative

The No-Action Alternative involves no construction activities or changes to the current system. Therefore, no impacts to the noise environment in the Pāhala area would occur.

3.19 Visual Considerations and Light Pollution

3.19.1 Existing Conditions

(a) All Alternative Sites

The February 2005 County General Plan identified a number of sites as important visual resources contributing to the natural beauty of the Kaʻū District. These visual resources typically consist of scenic resources including major land forms, open spaces, viewing points, scenic drives, and other physical features. The natural beauty of the landscape in the southern part of

the Kaʻū District is characterized by vistas from the mountain slopes to the oceans. The coastline is highlighted by Manuka Bay, Green Sands Beach, and Punaluu Black Sand Beach. Some of the natural beauty sites identified in the Kaʻū District most pertinent to the Pāhala area include: 1) view of Mauna Loa from the highway; 2) scenic view of the shoreline between Pāhala and Punaluu; and 3) the lava flows of 1868, 1887, and 1907.

The Pāhala community consists almost entirely of single-family residential units and the related utility lines that service the homes. Generally, residential units are set back from the adjacent roadway so the views of nearby areas are not obstructed.

Exterior lighting is often used to enhance the safety and security of persons and property. Excessive and inappropriate exterior lighting, however, can generate light pollution. As described in Section 3.13.1, outdoor lighting can also result in adverse effects to seabirds by attracting them at night and causing disorientation, fallout, and injury or mortality. The County of Hawaiʻi regulates outdoor lighting under Section 14-50 of the Hawaiʻi County Code. Streets in the Pāhala community are lined with street lights mounted on utility poles. The three alternative sites for the proposed wastewater treatment and disposal facility (Sites 7, 8, and 9) are used for macadamia nut production, with no existing outdoor lighting.

3.19.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7)

The Proposed Action is not expected to adversely affect the views or viewsheds identified in the County General Plan. The wastewater collection system would be installed below the streets and therefore would not impact views. The operations building, headworks cover structure, and low berms around the basins would be the only above-grade structures. The existing pine trees along Maile Street, most of which would remain with no changes, would continue to obstruct the viewplanes from Maile Street. The facility site would be adjacent (makai) to, and visible from, Māmalahoa Highway (State Route 11); however, impacts to the viewplane would be mitigated by the planted trees in the basins and by the rise in elevation between the highway and the facility.

Exterior lighting at the proposed wastewater treatment and disposal facility would be designed in accordance with Section 14-50 of the Hawaiʻi County Code and would be limited to manually-switched lights under the roof overhang at the entrance to the operations/electrical building and at the headworks area. Lights would be installed with down-shielding to prevent excess light pollution. When an operator or maintenance staff are not present on-site, lights would not be on. If necessary as a result of the consultation with FWS, the Proposed Action would incorporate additional impact avoidance measures related to lighting (e.g., avoidance of nighttime construction activities during seabird fledging period).

Abandonment of the two LCCs and the existing wastewater collection system would not affect visual resources or light pollution within the affected areas.

(b) Alternative Sites 8 and 9

Under Alternative Sites 8 and 9, the visual and light pollution impacts and mitigation measures would be similar to those discussed above for the Preferred Alternative (Site 7). Pine trees would be maintained between the wastewater treatment and disposal facility and public views from the adjacent streets to minimize visual impacts, except where necessary to accommodate the driveway into the facility. The planted trees in the proposed slow-rate land application basins would partially replace removed trees and exterior lighting at the facility would be minimal.

(c) No-Action Alternative

The No-Action Alternative would not change the current conditions in the Pāhala area and no visual impacts would occur.

3.20 Public Services – Police Protection

3.20.1 Existing Conditions

(a) All Alternative Sites

The Hawaiʻi County Police Department provides police services to the Kaʻū District, which includes Pāhala and other nearby communities. A single police station is located in Nāʻālehu, which serves the entire Kaʻū District. The Kaʻū Patrol District encompasses 700 square miles and is bound by the Kona District at Kaulanamauna and the Puna District at Keauhou Landing. Its officers operate out of a central station in Naʻalehu and a substation in Hawaiʻi Ocean View Estates subdivision.

3.20.2 Impacts and Mitigation Measures

(a) All Alternative Sites

The Proposed Action is expected to create no additional demand for police protection and related services since it will not increase the resident population or visitors to the area. The Proposed Action should have minimal impact on the police department's operations or ability to provide adequate protection services to the surrounding community. If necessary, off-duty police staff may be hired to assist with directing traffic during construction activities.

Operation of the proposed wastewater treatment and disposal facility is not expected to impact the Police Department. The facility would have a security fence around the perimeter with a locked entry gate.

Abandonment of the two LCCs could reduce the need for police protection services to handle public health threats in the event that there is damage to the LCCs (e.g., from volcanic or seismic activity). Otherwise, Abandonment of the two LCCs and the existing wastewater collection system would not affect police protection services in the County.

(b) No-Action Alternative

The No-Action Alternative would not impact police protection services due to continued operation of the existing LCCs. In the event that there is damage to the LCCs from some unforeseen event (e.g., volcanic or seismic activity), police protection services may be required to handle public health threats resulting from damage to the LCCs.

3.21 Public Services – Fire Protection

3.21.1 Existing Conditions

(a) All Alternative Sites

Fire protection and related services are provided from a fire station located in Pāhala. The station and a volunteer station provide 24-hour fire protection and emergency medical services (EMS). The County has contracted with the State Department of Health for emergency medical ambulance services.

3.21.2 Impacts and Mitigation Measures

(a) All Alternative Sites

The proposed wastewater treatment and disposal facility would include a fire protection line to be used in the event of a fire. The emergency generator would include a double-walled diesel fuel tank of a type allowed by the County. The Proposed Action would not affect the operations of fire protection and EMS services in Pāhala and the proposed wastewater treatment and disposal

facility would not require additional fire protection services on site. The construction plans would be submitted to the Fire Department for review during the project design phase.

Abandonment of the two LCCs could reduce the need for fire protection services to handle public health threats in the event that there is damage to the LCCs (e.g., from volcanic or seismic activity). Otherwise, Abandonment of the two LCCs and the existing wastewater collection system would not affect fire protection services in the County.

(b) No-Action Alternative

The No-Action Alternative would not impact fire protection services due to continued operation of the existing LCCs. In the event that there is damage to the LCCs from some unforeseen event (e.g., severe flood, volcanic or seismic activity), fire protection services may be required to handle public health threats resulting from damage to the LCCs.

3.22 Infrastructure – Water System

3.22.1 Existing Conditions

(a) All Alternative Sites

The County of Hawaiʻi Department of Water Supply (DWS) provides water service to the Pāhala community from ground water sources. The water lines are primarily located along or under the roadways in the area. In response to the pre-assessment notification, on April 5, 2018, the DWS noted that the wastewater treatment and disposal project site is not serviced by the DWS. The nearest point of connection to the DWS system is at an existing 6-inch waterline at the intersection of Huapala Street and Maile Street, approximately 2,000 feet northeast of Site 7. Sites 8 and 9 are an additional 1,600 to 3,200 feet, approximately, from the DWS connection point.

3.22.2 Impacts and Mitigation Measures

(a) Preferred Alternative (Site 7)

The proposed wastewater treatment and disposal facility would require potable water and fire protection lines from the end of the existing DWS system to the preferred location of the headworks operations building. The lines would require trenching, primarily on Maile Street, and construction plans would identify the horizontal and vertical clearances required to avoid existing water system and collection system lines. As required by DWS, construction plans would show the estimated maximum daily water usage calculations prepared by a professional engineer licensed in the State of Hawaiʻi. After review of the calculations, DWS would determine if enough water is available and a water commitment could be issued.

Abandonment of the two LCCs and the existing wastewater collection system would not affect water system infrastructure in Pāhala.

(b) Alternative Sites 8 and 9

Under Alternative Sites 8 and 9, the water system infrastructure impacts and mitigation measures would be similar to those described above for the Preferred Alternative (Site 7). Compared to Site 7, approximately 1,600 feet of additional pipe within the ROW of Lower Maoula Road would need to be installed to provide Site 8 with potable water and fire protection lines. To provide Site 9 with potable water and fire protection lines, approximately 3,200 feet of additional pipe within the ROW of Maile Street and across Māmalahoa Highway would need to be installed.

(c) No-Action Alternative

The No-Action Alternative includes no modifications to the existing water infrastructure, and therefore would not cause any impacts to the water system in Pāhala.

3.23 Infrastructure – Drainage System

3.23.1 Existing Conditions

(a) All Alternative Sites

There is no existing County stormwater drainage system in Pāhala. Existing stormwater runoff from the Pāhala District generally collects along the paved roadways within each subdivision and sheet flows towards Māmalahoa Highway, then disperses into open swales or grassed areas.

3.23.2 Impacts and Mitigation Measures

(a) All Alternative Sites

The Proposed Action would incorporate appropriate stormwater and erosion control measures in accordance with approved plans to ensure that soil erosion and transport during construction activities are minimized. Construction of the proposed wastewater collection system would require trenches for new lines, and silt fences or filter socks would be used to minimize runoff from the disturbed area. The proposed wastewater treatment and disposal facility would include an on-site drainage system to address stormwater surface runoff caused by new impervious surfaces at the facility. The site would include a system to collect runoff via grated inlets or swales, and flows would be conveyed to on-site drainage detention systems, such as subsurface linear infiltration or depressed detention basins. Landscape buffers with dirt berms would also be constructed around most of the perimeter of the facility to act as secondary containment in the event of a large storm event. The on-site stormwater management system would meet the requirements of Hawaiʻi County Code, Chapter 27, Section 20, which mandates drainage plans to accommodate runoff caused by the facility for a 1-hour, 10-year storm event.

Abandonment of the two LCCs and the existing wastewater collection system would not affect drainage or runoff in the affected areas.

(b) No-Action Alternative

The No-Action Alternative would not result in a change to the impervious area within or near Pāhala and would therefore not lead to an increase in runoff or other impacts to drainage in the area.

3.24 Infrastructure – Electrical and Communications Systems

3.24.1 Existing Conditions

(a) All Alternative Sites

Electrical services to the Pāhala area are provided by Hawaiian Electric Light Company (HELCO) via pole-mounted overhead lines located along the roadways. Hawaiian Telcom is the primary telecommunications provider within the County of Hawaiʻi. The HELCO lines are located along Māmalahoa Highway, leading to a substation west of the intersection of Kamani Street and the highway. HELCO is regulated by the State and owns and operates a number of power generation facilities in the County.

HELCO presently has overhead electrical lines situated on utility poles routed along the streets within the Pāhala community. Similarly, Hawaiian Telcom has overhead lines for telephone service.

3.24.2 Impacts and Mitigation Measures

(a) All Alternatives

The wastewater treatment and disposal facility would require electrical power. It is anticipated that HELCO would bring overhead power lines to the selected site and supply 480-volt, 3-phase power to the facility via a pole-mounted transformer. This would be connected to a service panel with a meter. The floating surface aerators would consume the majority of the electricity supplied to the site. An electrical room would house the electrical gear and plant control equipment. Exterior lighting at the site would be limited to manually switched lights at the entrance to the operations/electrical building and at the headworks area. A standby power system would be provided in the form of a pad-mounted diesel generator and aboveground fuel tank with capacity to support three consecutive days of operation. In addition, the electrical service panel would be equipped with a manual transfer switch and generator receptacle to allow connection of a trailer-mounted generator in the event of emergency generator failure during an extended power outage.

A land-line and/or cellular telephone telemetry system would be used to connect the wastewater treatment and disposal facility to DEM and facilitate communication with staff in Hilo.

To avoid damaging existing buried infrastructure during construction, the construction contractor would be required to call the one-call center prior to any construction activities to allow demarcation of underground utilities to occur.

Abandonment of the two LCCs and the existing wastewater collection system would not affect electrical and communications infrastructure in the area.

(b) No-Action Alternative

The No-Action Alternative does not require any electrical power and includes no construction activities that could disrupt buried utility infrastructure. Therefore, no impacts to electrical and telecommunications infrastructure would occur.

4 CUMULATIVE EFFECTS

The Proposed Action (construction of a new wastewater treatment and disposal facility and a new collection system, closure of existing LCCs, and connection of newly accessible properties to the sewer system), in combination with other past, present, or reasonably foreseeable actions at or near Pāhala, could contribute to cumulative improvements and impacts on certain environmental resources. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

4.1 Scope of Analysis

This section identifies the other past, present, or reasonably foreseeable actions at or near Pāhala that were considered and evaluated in this cumulative improvements and impacts analysis.

4.1.1 Past, Present, and Reasonably Foreseeable Actions

Only one significant project has occurred in or near Pāhala in the recent past – specifically, the construction of a new gymnasium at Kaʻū High School and Pāhala Elementary School in the center of Pāhala, approximately one-half mile north of the site of the Proposed Action. The gym was constructed to also serve as a community shelter during emergencies. Construction began in October 2012 and completed in early 2016.

The school's LCC was previously replaced with a DOH-approved septic system that included two new laterals at the property line on Hala Street and Kamani Street to allow eventual connection to the new collection system. Following completion of the Proposed Action, the State Department of Education will connect the Kaʻū High School and Pāhala Elementary School (including the Kaʻū District Gym and Shelter) to the new collection system and will properly close the onsite septic system.

There are no current projects in or around Pāhala, and no reasonably foreseeable actions (other than connection of the Kaʻū High School and Pāhala Elementary School to the new collection system) are planned based on review of the County's Capital Improvement Plan and the Kaʻū Community Development Plan.

4.1.2 Actions Considered but Excluded from Analysis

The community of Naʻalehu, approximately 14 miles southwest of Pāhala, is also considering options for closure of LCCs and development of a new wastewater treatment system. The Naʻalehu project was excluded from this analysis of cumulative improvements and impacts because, due to its distance from Pāhala, the effects of that project are not expected to have a significant cause-and-effect relationship with the direct and indirect effects of the Proposed Action. The Naʻalehu project is undergoing separate community outreach and environmental review processes that will identify potential impacts for that project separately from the Pāhala wastewater system improvements.

The Kaʻū Community Development Plan includes potential long-term improvements including a potential expansion of the sewer collection system in Pāhala. This expansion was also considered in preliminary design of the Pāhala wastewater treatment and disposal facility during analysis of potential influent flows to the treatment system. However, the Community Development Plan does not present a timeline for this expansion; no substantial planning or scoping of a collection system expansion has been conducted, and this expansion is unlikely to occur within the next 10 to 20 years. This action was therefore excluded from this analysis of cumulative improvements and impacts.

4.2 Cumulative Improvements and Impacts Analysis

This analysis identified the following potential cumulative effects resulting from the Proposed Action, construction of the Kaʻū District Gym and Shelter, and connection of the Kaʻū High School and Pāhala Elementary School to the new collection system:

- Installation of new exterior lighting, resulting in potential nighttime light pollution and distraction to night-flying birds;
- Removal of vegetation and construction of new impervious surfaces, resulting in a potential increase in stormwater runoff; and
- Increase in influent flows from the Kaʻū High School and Pāhala Elementary School to the new wastewater treatment and disposal facility.

Both the Proposed Action and the Kaʻū District Gym and Shelter construction have incorporated mitigation measures to reduce nighttime light pollution and impacts to night-flying birds. Specifically, the Kaʻū District Gym and Shelter incorporated minimal use of security lighting, which are shielded in accordance with the County's exterior lighting standards, and outdoor parking lights are turned off at 11:00 pm to avoid impacts to birds and bats. As discussed in Section 3.19.2, the Proposed Action would incorporate lighting that complies with the County's exterior lighting standards and FWS guidance, and the new facility would generally be dark at night, with exterior lighting used only for emergency maintenance purposes. Adherence to these requirements would minimize the potential cumulative light pollution impacts from these projects.

To reduce stormwater impacts, the Kaʻū District Gym and Shelter incorporated new dry wells and grass parking, instead of paved parking, to the extent allowable by the Hawaiʻi Planning Department. The Proposed Action would incorporate permanent BMPs such as subsurface linear infiltration or depressed detention basins to detain flows and volumes to their pre-development conditions. Additionally, due to the relatively young and porous geology of the Kaʻū district, any increases in stormwater runoff generated by these projects are anticipated to infiltrate to groundwater without presenting cumulative erosion concerns.

Finally, while the connection of the Kaʻū High School and Pāhala Elementary School to the new wastewater treatment and disposal facility would increase the treatment capacity requirements for the facility, this was accounted for in the facility's preliminary design.

Based on the above, the Proposed Action is not expected to result in any significant cumulative improvements or impacts to the environment in combination with other past, present, or reasonably foreseeable actions.

5 FEDERAL CROSS CUTTER REQUIREMENTS

This project may be funded by federal funds provided by the U.S. Environmental Protection Agency (EPA) through the State of Hawaiʻi's Clean Water State Revolving Fund (CWSRF) Program. As such, the State of Hawaiʻi Department of Health (DOH) must conduct an environmental review of projects funded under the CWSRF as required under the Code of Federal Regulations (CFR), using the EPA-approved State Environmental Review Process. In addition, the State must comply with the Federal cross-cutting authorities set forth in 40 CFR §35.3145 for the CWSRF. These requirements are set forth as "cross cutters" described as follows.

5.1 Archaeological and Historic Preservation Act (54 U.S.C. § 312502)

The Archaeological and Historic Preservation Act (AHPA), also known as the Archaeological Recovery Act and the Moss-Bennett bill, was passed and signed into law in 1974. It amended and expanded the Reservoir Salvage Act of 1960. The AHPA built upon the national policy, set out in the Historic Sites Act of 1935, "*to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance*". The AHPA expanded the policy by focusing attention on significant resources and data but does not require that they be shown to be of "national" significance. The AHPA required that federal agencies provide for *"...the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of...any alteration of the terrain caused as a result of any Federal construction project of federally licensed activity or program*."

54 U.S.C. §312502, (a) states: "*When any Federal agency finds, or is notified, in writing, by an appropriate historical or archeological authority, that its activities in connection with any Federal construction project or federally licensed project, activity, or program may cause irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data, the agency shall notify the Secretary, in writing, and shall provide the Secretary with appropriate information concerning the project, program, or activity…*"

54 U.S.C. 312502 (b) states: "*When any Federal agency provides financial assistance by loan, grant, or otherwise to any private person, association, or public entity, the Secretary, if the Secretary determines that significant scientific, prehistorical, historical, or archeological data might be irrevocably lost or destroyed, may, with funds appropriated expressly for this purpose-*

> *(A) Conduct, with the consent of all persons, associations, or public entities having a legal interest in the property, a survey of the affected site; and*
>
> *(B) Undertake the recovery, protection, and preservation of the data (including analysis and publication)."*

The proposed collection system would be constructed primarily within existing County streets and two short segments within private easements in the Pāhala community that have been previously disturbed when the streets were constructed. Preliminary analysis shows the proposed treatment and disposal facility would be constructed in an area that does not contain archaeological resources. An Archaeological Inventory Survey (AIS), including subsurface testing, will be conducted to confirm the presence/absence of archaeological resources on the preferred site.

The contract drawings will state that, should archaeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (SHPD), who will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

5.2 Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668c)

The Bald Eagle Protection Act (16 U.S.C. §§ 668-668c) prohibits any act to take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner any bald eagle commonly known as the American eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof of the foregoing eagles.

No bald or golden eagles are found in Hawaiʻi.

5.3 Clean Air Act (42 U.S.C. § 7401)

The Federal Air Pollution Control Act 42 U.S.C. §7506(c), Clean Air Act (CAA), was preceded by a series of legislation affecting air quality. Over the years, there have been a number amendments adopted related to air quality and all called the CAA. The first federal legislation regarding air pollution *control was the Clean Air Act of 1963*. The Clean Air Act of 1970 (1970 CAA) authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources.

The 1970 CAA set forth four major regulatory programs affecting stationary sources: the National Ambient Air Quality Standards (NAAQS), State Implementation Plans (SIPs), New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants. In Hawaiʻi, the DOH, Clean Air Branch, Air Quality program is defined by HAR Chapter 11-60 and serves as the SIP approved by the Environmental Protection Agency (EPA).

The DOH operates a network of air quality monitoring stations at various locations around the State. In December 2016, the DOH issued the Annual Summary 2015 Air Quality Data report (the most recent report) which provides the results from the network of air quality monitoring stations. The DOH maintains a monitoring station the grounds of the Kau High and Pahala Elementary School. Established August 2007, the station was placed to monitor SO_2 and $PM_{2.5}$ from volcanic emissions. In 2015, Hawaiʻi was in attainment of the state annual SO_2 standard. In 2015, Hawaiʻi was in attainment with the annual $PM_{2.5}$ NAAQS.

Volcanic eruptions are considered natural events and therefore EPA may exclude the exceedances of the 1-hour NAAQS from attainment determinations.

The rural nature of Pāhala area has no major stationary sources of air pollution. Further, the low level of vehicle traffic on Mamalahoa Highway and on the streets in the community would limit mobile sources of emissions.

The quality of air in the general Pāhala area is considered "Good." Existing sources of air pollution are emissions from motor vehicles traveling along Māmalahoa Highway. Potential short-term effects from dust and exhaust due to construction activities will be minimized with BMPs such as water sprinkling and proper equipment maintenance. No long-term impacts on air quality resulting from operation of the collection system and the treatment and disposal facility are anticipated.

5.4 Coastal Barrier Resources Act (U.S.C. §3501)

In 1982, Congress passed the Coastal Barrier Resources Act (CBRA) (16 U.S.C. §3501) to encourage the conservation of hurricane prone, biologically rich coastal barriers by restricting federal expenditures that encourage development, such as Federal flood insurance through the National Flood Insurance Program.

The Coastal Barrier Resources Reauthorization Act of 2000 reauthorized the CBRA and directed the U.S. Fish and Wildlife Service to complete a Digital Mapping Pilot Project that includes digitally produced draft maps for up to 75 John H. Chafee Coastal Barrier Resources System (CBRS) areas and a report to Congress that describes the feasibility and costs for completing digital maps for all CBRS areas.

The purpose the CBRA is to minimize the loss of human life, wasteful expenditure of federal revenues, and the damage to fish, wildlife, and other natural resources associated with the coastal barriers along the Atlantic and Gulf coasts and along the Great Lakes by restricting future federal expenditures and financial assistance which have the effect of encouraging development of coastal barriers.

Based on its location, the CBRA is not applicable to Hawai'i.

5.5 Coastal Zone Management Act (16 U.S.C. §1451)

The Coastal Zone Management Act of 1972 (CZMA), 16 U.S.C § 1451-1464, was passed to establish a national policy to preserve, protect, develop, and where possible, restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations and to encourage coastal states to develop and implement coastal zone management programs (CZMPs). Each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs. Each federal agency carrying out an activity subject to the Act shall provide a consistency determination to the relevant State agency designated under section 1455(d)(6) of this title at the earliest practicable time.

In 1977, Hawai'i enacted Chapter 205A, HRS, Hawai'i Coastal Zone Management (CZM) Program. The CZM area encompasses the entire state, including all marine waters seaward to the extent of the state's police power and management authority, including the 12-mile U.S. territorial sea and all archipelagic waters. The objective and policies of the CZM is set forth §205A-2, HRS. See detail discussion in Section 6 Plans, Policies and Controls. A summary follows.

(1) Recreational Resources

Objective:
Provide coastal recreational opportunities accessible to the public.

Policies:
(A) Improve coordination and funding of coastal recreational planning and management; and
- *(i) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by: Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
- *(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;*
- *(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
- *(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
- *(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*
- *(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.*
- *(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
- *(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of*

land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

The Pāhala community is located about 3.8 miles from the shoreline and as such would not affect coastal resources.

(2) Historic Resources

Objective:

(A) Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(A) Identify and analyze significant archaeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

The proposed wastewater collection system would be constructed along the existing County streets and two short segments within easements in the Pāhala community that have been previously disturbed when the streets were constructed. Preliminary analysis shows the treatment and disposal facility would be constructed in an area that does not contain archaeological resources. An AIS, including subsurface testing, will be conducted to confirm the presence or absence of archaeological resources on the project site.

The contract drawings will state that, should archaeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work would cease immediately and the find would be protected from further damage. The contractor would immediately contact the SHPD, who will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

(3) Scenic and Open Space Resources

Objective:

(A) Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments which are not coastal dependent to locate in inland areas.

The Pāhala community is located about 3.8 miles from the shoreline and, as such, coastal scenic and open space resources would not be affected.

(4) Coastal Ecosystems

Objective:

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
(B) Improve the technical basis for natural resource management;
(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

The Pāhala community is located about 3.8 miles from the shoreline and, as such, coastal ecosystems would not be adversely affected.

(5) Economic Uses

Objective:
(A) Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:
(A) Concentrate coastal dependent development in appropriate areas;
(B) Ensure that coastal dependent developments such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;
(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

The Pāhala community is located about 3.8 miles from the shoreline. The collection system and the treatment and disposal facility would be sited in suitable locations to serve the Pāhala community.

(6) Coastal Hazards

Objectives:
(A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies:
(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
(B) Ensure that developments comply with requirements of the Federal Flood Insurance Program;
(C) Prevent coastal flooding from inland projects.

The Pāhala community is located about 3.8 miles from the shoreline. The proposed collection system and treatment and disposal facility do not include improvements related to tsunami, storm waves, stream flooding erosion, subsidence and pollution.

(7) Managing Development

Objective:

(A) Improve the development review process, communication, and public participation in the management of coastal resource and hazards.

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

(C) Communicate the potential short- and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

In December 2017, a total of 5 community outreach sessions regarding the project were conducted in the Pāhala community, which is located about 3.8 miles from the shoreline. The collection system and treatment and disposal facility does not involve management of coastal resources and hazards.

(8) Public Participation

Objective:

(A) Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Promote public involvement in coastal zone management processes;

(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

In December 2017, a total of 5 community outreach sessions were conducted in the Pāhala community which is located about 3.8 miles from the shoreline.

(9) Beach Protection

Objective:

(A) Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

The Pāhala community is located about 3.8 miles from the shoreline. The collection system and the treatment and disposal facility project does not include improvements that would affect public use beaches.

(10) Marine Resources

Objective:

(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

(D) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(E) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

(F) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(G) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(H) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The Pāhala community is located about 3.8 miles from the shoreline. The collection system and the treatment and disposal facility project does not include improvements that would affect development of marine and coastal resources.

5.6 Endangered Species Act (16 U.S.C. §1531)

On December 28, 1973, the Endangered Species Act, Pub L 93-205, was passed and, over the years, has been amended a number of times. The Act is set forth in 16 U.S.C. §1531. The stated purpose of the original Act to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of various related the treaties and conventions. The provisions of the Act are administered by the U.S. Department of the Interior Fish and Wildlife Service (FWS) and the U.S. Department of the Interior National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while NOAA/NMSF is mainly responsible for marine wildlife.

16 U.S.C. § 1536, Interagency Cooperation (Section 7 of the Act), states each federal agency shall, in consultation with and with the assistance of the Secretary of the Interior, ensure that any action authorized, funded, or carried out by such agency (an "agency action") is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action.

In August 2018, a biological resources field survey was conducted on the preferred project site. The results of the survey show that, due to the proposed alignment of the collection system along existing roadways, vegetation consists entirely of maintained yards with ornamental plants.

The field survey of the 14.9-acre preferred site for the proposed treatment and disposal facility indicates that the site is comprised of a macadamia nut orchard of mature trees, unmaintained

areas outside the orchard dominated by Guinea grass, lanes of windbreak trees oriented between orchard units, and (mostly) mowed road verge areas. A total of 52 species of vascular plants: 2 ferns, one gymnosperm, and 49 species of angiosperms (flowering plants) were identified during the survey. Only two species (4%) identified during the survey are regarded as native to the Hawaiian Islands and both are indigenous (native, but also distributed elsewhere in the Pacific). Being widely distributed indigenous species, neither is listed as threatened or endangered or of any special concern

The August 2018 field survey included assessment of mammalian species. With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or ʻōpeʻapeʻa as it is known locally, all terrestrial mammals currently found on the Island of Hawaiʻi are alien species, and most are ubiquitous. The field survey reported no mammalian species within the survey area. This also included no indication that pigs (*Sus scrofa*) utilize the survey area.

The field survey also included an assessment of avian species, and recorded a total of 175 individual birds of 13 species, representing nine separate families, during station counts. Avian diversity and densities were very low, in keeping with the current usage of the site as a mature macadamia nut orchard, with minimal ground cover and few weedy or shrubby species. All of the avian species recorded during the course of the survey are established alien species. No native avian species were recorded during the course of the survey.

The field survey recorded no species of plants or animals currently listed or proposed for listing under either the Federal or State of Hawaiʻi endangered species statutes. Based on this finding, and the lack of critical habitat in the potential construction area, the Proposed Action is not likely to adversely affect biological resources, and EPA will informally consult with FWS to receive concurrence of this determination.

5.7 Environmental Justice Executive Order 12898

Executive Order 12898, Environmental Justice (full title Federal Actions to Address Environmental Justice to Minority and Low Income Populations), was signed on February 11, 1994. The intent of Executive Order 12898 is to avoid disproportionately high adverse human health or environmental effects of projects on minority and low income populations. Executive Order 12898 also requires federal agencies ensure that minority and low income communities have adequate access to public information related to health and the environment.

The intent of Executive Order 12898 is to avoid disproportionately high adverse human health or environmental effects of projects on minority and low income populations. Executive Order 12898 also requires federal agencies ensure that minority and low income communities have adequate access to public information related to health and the environment.

The 2017 American Community Survey (5-Year Estimates) is the most recent information related to socioeconomic conditions in the state and County. The 2017 American Community Survey includes Hawaiʻi Geographic Area Profiles – Census Designated Places: Neighbor Islands. The ACS noted it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

The American Community Survey shows the Pāhala population is about the same age as Hawaiʻi County, although Pāhala has a higher portion in the Under 5 to 19 age category (30.0 percent compared to 23.4 for the County). The median age for the Pāhala is 42.5 years compared to 42.6 years for the County.

The racial composition of the population shows Pāhala to have a smaller portion of White (10.5 percent compared to 32.6 percent for the County). Pāhala has high portion of Filipino (29.9

percent compared to 9.5 percent for the County). Pāhala has lower Other Minority Populations, including Native Hawaiʻians than Hawaiʻi County.

In terms of education, Pāhala has a higher portion that has completed high school and some college (81.5 percent) than the County (69.6 percent), and lower portions with bachelor degree and graduate or professional degree (12.3 percent compared to 27.6 percent in the County).

Pāhala had a higher portion with household incomes less than $49,999 (49.9 percent) than the County (45.8 percent), and a higher portion between $50,000 to $99,000 (35.2 percent) than the County (30.3 percent). Pāhala had lower median household income ($50,125) than the County ($55,750).

Lastly, Pāhala had a higher portion of employment in agriculture, fishing and construction (29.2 percent) compared to the County (10.4 percent), and education and health care (27.1 percent) compared to the County (19.9 percent).

Analysis by race shows Pāhala has a higher proportion in minority groups (47.3 percent) compared to the County (38.3 percent). Analysis of the household income categories shows Pāhala and the County are about the same in the key "middle income" groups that cover the range from $25,000 to $99,000. These incomes groups account for about 53.5 percent of residents in Pāhala and 54.5 percent in the County. Overall Pāhala has a higher portion of minority groups than the County, but household incomes, especially the "middle income" groups, are almost same for Pāhala and the County.

Based on the above, construction and operation of the collection system and the treatment and disposal facility would not have a disproportionately high adverse impact on the minority and low income population in the Pāhala community.

5.8 Farmland Protection Policy Act (7 U.S.C. §4201)

The Agriculture and Food Act (Public Law 97-98) was passed in 1981 and contained the Farmland Protection Policy Act (FPPA), Subtitle I of Title XV, Section 1539-1549. The stated purposes of the FPPA are to: 1) minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses; and 2) assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with State, unit of local government, and private programs and policies to protect farmland. "Farmland" subject to FPPA requirements does not have to be currently used for cropland.

The FPPA is administered by the U.S. Department of Agriculture (USDA), National Resources Conservation Service. "Farmland", as used in the FPPA, includes prime farmland, unique farmland, and land of statewide or local importance, as defined by the State of Hawaiʻi Department of Agriculture.

The proposed collection system would be located primarily within the streets and shoulders in Pāhala and therefore would not affect farmlands. The preferred location for the proposed treatment and disposal site is located within an existing macadamia nut orchard. The 2012 Census Agriculture shows about 17,378 acres in the County are planted with macadamia nuts. As such, removal of the 14.9-acre area required for the Proposed Action at the preferred site would not significantly affect macadamia nut production in the State or the County.

5.9 Fish and Wildlife Coordination Act (16 U.S.C §661)

The Fish and Wildlife Coordination Act, 16 U.S.C §661, enacted on March 10, 1934, was amended on August 12, 1958. The purpose of Act is to recognize vital contribution of wildlife resources to the Nation, the increasing public interest and significance, and to provide that wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource development programs through the effectual and harmonious planning, development,

maintenance, and coordination of wildlife conservation. 16 U.S.C. §666b defines wildlife and wildlife resources as birds, fishes, mammals and all other classes of wild animals, and all types of aquatic and land vegetation upon which wildlife is dependent.

The Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, and their habitat, in controlling losses of the from disease or other causes, in minimizing damages from overabundant species, in providing public shooting and fishing areas, including easements across public lands (2) to make surveys and investigations of the wildlife of the public domain, including lands and waters acquired or controlled by any agency; and (3) to accept donations of land and contributions of funds in furtherance of the purposes of the Act.

16 U.S.C. §665 states that the Secretary of the Interior, through the FWS and the U. S. Bureau of Mines, is authorized to make such investigations as he deems necessary to determine the effects of domestic sewage, mine, petroleum, and industrial wastes, erosion silt, and other polluting substances on wildlife, and to make reports to the Congress concerning such investigations and of recommendations for alleviating dangerous and undesirable effects of such pollution. These investigations shall include (1) the determination of standards of water quality for the maintenance of wildlife; (2) the study of methods of abating and preventing pollution, including methods for the recovery of useful or marketable products and byproducts of wastes; and (3) the collation and distribution of data on the progress and results of such investigations for the use of Federal, State, municipal, and private agencies, individuals, organizations, or enterprises.

The field survey recorded no species of plants or animals currently listed or proposed for listing under either the Federal or State of Hawaiʻi endangered species statutes. No critical habitat was identified at the preferred location (Site 7). As a result, the Proposed Action is not likely to adversely affect any flora or fauna, or habitat on which they rely.

5.10 Floodplain Management (Executive Order 19888, as amended by Executive Orders 1248 and 13690)

Executive Order 11988, Floodplain Management, dated May 24, 1977 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities.

The Proposed Action is not located within a floodplain area and therefore would not have a significant impact on floodplains in the Pāhala area.

5.11 Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §1801

The 1996 Sustainable Fishery Act amendments to the Magnuson-Stevens Fishery Conservation and Management Act and subsequent Essential Fish Habitat (EFH) Regulatory Guidelines (NOAA, 2002) describe provisions to identify and protect habitats of federally-managed marine and anadromous fish species. Under the various provisions, federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with the NMFS.

Congress defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH is further defined by the existing regulations (MSFCMA, 1996;

NOAA, 2002). “Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

The Pāhala community is located about 3.8 miles from the shoreline. The Proposed Action would not adversely impact EFH.

5.12 Marine Mammal Protection Act (16 U.S.C. §§ 703 *et seq.*)

The Marine Mammal Protection Act (MMPA), 16 U.S.C. §§1361 *et seq*., protects all marine mammals. The MMPA includes a general moratorium on the taking and importing of marine mammals, and prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. Jurisdiction for MMPA is shared by the FWS and NMFS. The FWS Branch of Permits is responsible for issuing take permits when exceptions are made to MMPA. Under the exception for incidental taking, the FWS or the NMFS must find that the total taking over the five-year period will have a “negligible impact” and will not adversely affect the availability of the marine mammal species or stock for subsistence use by natives.

The Pāhala community is located about 3.8 miles from the shoreline. The Proposed Action would not adversely impact marine mammal communities and would not encourage any “take” of marine mammals.

5.13 Migratory Bird Treaty Act (16 U.S.C. §§ 703 *et seq.*)

The Migratory Bird Treaty Act (MBTA) and EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) provide for the protection of migratory birds. The MBTA of 1918, as amended (16 U.S.C. 703-712) makes it unlawful to, among other things, pursue, hunt, take, capture, kill, transport or import any species listed under the Act. The Act implements conventions between the U.S., Great Britain, Mexico, Japan, and the former Soviet Union.

EO 13186 was issued to assist federal agencies with their efforts to comply with the MBTA. It should be noted that the EO does not constitute any legal authorization that in any way supersedes the requirements outlined in the MBTA. The EO directs federal agencies undertaking actions that have or are likely to have a measurable adverse impact on migratory bird populations to develop and implement a Memorandum of Agreement with the FWS addressing the conservation of these populations.

The field survey at the preferred site (Site 7) recorded no species of plants or animals currently listed or proposed for listing under either the Federal or State of Hawaiʻi endangered species statutes. The field survey did indicate that endemic Hawaiian Petrel (*Pterodroma sandwichensis*) and Newell’s Shearwater (*Puffinus newelli*) have been recorded flying over the general area between April and the end of November each year. Impact avoidance and minimization measures would be implemented, including down-shielding of lights and other measures to prevent impacts to migratory birds.

5.14 National Historic Preservation Act (U.S.C. 54 §300101)

The National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665; U.S.C. 54 §300101 requires a federal agency undertaking an action/project consider of the effect of the project on any historic property defined as a district, site, building, structure, or object that is included in or eligible for inclusion in the National Register Historic Places.

U.S.C. 54 §306108 (commonly called Section 106 of the NHPA) requires a federal agency having direct or indirect jurisdiction over a federal or federally assisted undertaking to take into account the effect of the undertaking on any historic property. 54 U.S.C § 306102 requires the federal agency's preservation-related activities to be carried out in consultation with other federal, State, and local agencies, Indian tribes, Native Hawaiian organizations.

The proposed collection system would be constructed along the existing County streets and two short segments within private easements in the Pāhala community that have been previously disturbed when the streets were constructed. Preliminary analysis shows the proposed treatment and disposal facility would be constructed in an area that does not contain archaeological resources. An AIS, including subsurface testing, will be conducted to confirm the presence or absence of archaeological resources on the project site.

The contract drawings will state that, should archaeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work would cease immediately and the find would be protected from further damage. The contractor would immediately contact the SHPD, who will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

5.15 Protection of Wetlands (Executive Order 11990 (1977), as amended by Executive Order 12608 (1997))

Executive Order 11990, Protection of Wetlands, dated 1977 requires federal agencies to avoid, preserve, or mitigate effects of new construction projects on lands which have been designated wetlands. EO 11990 states in order to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative, it is hereby ordered as follows: Section 1. (a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

The field survey conducted in August 2018 at the preferred location for the proposed treatment and disposal facility (Site 7) identified no wetlands at the site. The survey report indicated that the National Wetlands Inventory (NWI) Wetlands Mapper identifies no features occurring within the preferred site, and no streams are shown on USGS topographic maps. Streams in the Pāhala area do not flow all the way to the sea, but terminate on Keoneʻeleʻele Flat to the southwest. Based on this information, the Proposed Action is not expected to adversely impact wetland resources.

5.16 Rivers and Harbors Act (33 U.S.C. § 403)

Originally enacted on March 3, 1899, the "Rivers and Harbors Appropriation Act of 1899" affects navigable waters of the U.S. The Act states the creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is prohibited; and it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines, or where no harbor lines have been established, except on plans recommended by the Chief of Engineers and authorized by the Secretary of the Army; and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port,

roadstead, haven, harbor, canal, lake, harbor or refuge, or inclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army prior to beginning the same.

The Pāhala community is located about 3.8 miles from the shoreline. The preferred location for the proposed treatment and disposal facility is sited about 1,500 feet east of the center line of Hionamoa Gulch. The USGS topographic map shows the gulch stops about 5,500 feet from the shoreline. Based on this, the collection system and the treatment and disposal facility would not affect navigable waters.

5.17 Safe Drinking Water Act (42 U.S.C. §300f)

The Safe Drinking Water Act (SDWA), 42 U.S.C. §300f was established to protect the quality of all waters actually or potentially designed for drinking use from both underground and aboveground sources. The SDWA authorizes EPA to establish minimum standards to protect potable water with which all owners or operators of public water systems must comply; to oversee the agencies which can be approved to implement these rules on EPA's behalf, such as State governments; and to encourage attainment of secondary standards (nuisance-related). The SDWA also establishes the Sole Source Aquifer Program, under which EPA also may evaluate Federal-funded projects to determine whether they have the potential to contaminate a sole source aquifer.

The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, rivers, lakes, reservoirs, springs, and ground water wells. (SDWA does not regulate private wells which serve fewer than 25 individuals.) SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. The EPA, states, and water systems then work together to make sure that these standards are met.

Section 1424(e) of the SDWA of 1974 (Public Law 93-523, 42 U.S.C. 300 et. seq), also established the Sole Source Aquifer program which states that no commitment for federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the EPA Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health.

The existing collection and disposal system serving the Pāhala community consists of sewer lines that do not meet current County standards for a wastewater collection system. Further, the existing disposal system consists of two LCCs that discharge untreated sewage into the subsurface. Lastly, the two LCCs are located within the underground injection control area designated as a drinking water source.

The Proposed Action would include installation of a gravity collection system consisting of PVC corrosion-resistant lines placed in trenches that meets current County standards. The proposed treatment and disposal facility would treat incoming flows through a series of lagoons and a subsurface flow constructed wetland and disinfection system, with final disposal in land application basis with media and trees for further treatment. Therefore, the Proposed Action is not expected to adversely impact drinking water sources and would replace the existing outdated system that does pose a threat to drinking water currently.

5.18 Wild and Scenic Rivers Act (16 U.S.C. 1271-1287)

The Wild and Scenic Rivers Act, 16 U.S.C. 1271-1287, declares that certain selected rivers with their immediate environments, which possess outstandingly remarkable scenic, recreational,

geologic, fish and wildlife, historical, cultural, or other similar values, shall be preserved in their free-flowing condition for the enjoyment of present and future generations.

The State of Hawaiʻi has no designated wild and scenic rivers. The Wild and Scenic Rivers Act is not applicable to this project.

6 PLANS, POLICIES AND CONTROLS

This section discusses the State and County of Hawaiʻi land use plans, policies and controls relating to the proposed project.

6.1 State Land Use Plans and Policies

6.1.1 Hawaiʻi State Plan

The Hawaiʻi State Plan, Chapter 226, HRS, as amended, provides goals, objectives, policies, and priorities for the State. The purpose of the Hawaiʻi State Plan is to set forth a plan that shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State; provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state, and county activities. The proposed project's consistency with applicable objectives and policies are discussed in Table 6.1.

Table 6.1
Hawaiʻi State Plan Objectives and Policies

Objectives and Policies of the Hawaiʻi State Plan	Discussion
§226-4 State goals. In order to ensure, for present and future generations, those elements of choice and mobility that ensure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve: (1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaiʻi's present and future generations. (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people. (3) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.	The Pāhala project will support the State economy by providing a wastewater collection system and a treatment and disposal facility to enhance the community and the physical well-being of the community.
§**226-5 Objective and policies for population.** (a) It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.	The Pāhala project does not include facilities or improvements that could guide or otherwise affect population growth in this area of Hawaiʻi.
§226-6 Objectives and policies for the economy--in general. (a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:	The Pāhala project does not include facilities or improvements that affect the economy of this area of Hawaiʻi.
§226-7 Objectives and policies for the economy--agriculture. (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:	The Pāhala project does not include facilities or improvements which would affect agriculture of this area of Hawaiʻi. The area used for the treatment and disposal facility will not adversely impact the total macadamia nut production on the state or County.
§226-8 Objective and policies for the economy--visitor industry. (a) Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaiʻi's economy	The Pāhala project does not include facilities or improvements that would affect the visitor industry of this area of Hawaiʻi.

Table 6.1
Hawaiʻi State Plan Objectives and Policies

Objectives and Policies of the Hawaiʻi State Plan	Discussion
§226-9 Objective and policies for the economy--federal expenditures. (a) Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaiʻi's economy.	The Pāhala project will include federal expenditures to provide a collection system and treatment and disposal facility for the community.
§226-10 Objective and policies for the economy--potential growth and innovative activities. (a) Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaiʻi's economic base.	The Pāhala project does not include facilities or improvements that would affect the potential growth of this area of Hawaiʻi.
§226-10.5 Objectives and policies for the economy--information industry. (a) Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawaiʻi as a leader in broadband and wireless communications and applications in the Pacific Region.	The Pāhala project does not include facilities or improvements that would affect the information industry of this area of Hawaiʻi.
§226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources. (b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to: (1) Exercise an overall conservation ethic in the use of Hawaiʻi's natural resources. (3) Take into account the physical attributes of areas when planning and designing activities and facilities.	The Pāhala project site is located about 900 feet mean sea level and about 3.8 miles from the shoreline. As such, it would not affect shoreline or marine resources.
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources. (b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to: (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	The Pāhala project does not include facilities or improvements that would affect the scenic, natural beauty and historic resources of this area of Hawaiʻi.
§226-13 Objectives and policies for the physical environment--land, air, and water quality. (b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to: (2) Promote the proper management of Hawaiʻi's land and water resources. (3) Promote effective measures to achieve desired quality in Hawaiʻi's surface, ground, and coastal waters.	The Pāhala project does not include facilities or improvements that would affect the physical environment of this area of Hawaiʻi.
§226-14 Objective and policies for facility systems--in general.	The Pāhala project is consistent with the County of Hawaiʻi plans for facilities.
§226-15 Objectives and policies for facility systems--solid and liquid wastes.	The Pāhala project does include facilities or improvements that would affect liquid waste facilities. The project provides a collection system and treatment and disposal facility for Pāhala community and closes LCCs in conformance with EPA requirements.

Table 6.1
Hawaiʻi State Plan Objectives and Policies

Objectives and Policies of the Hawaiʻi State Plan	Discussion
§226-16 Objective and policies for facility systems--water. (a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.	The Pāhala project does not include facilities or improvements that would affect water facilities.
§226-17 Objectives and policies for facility systems--transportation. (a) Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:	The Pāhala project does not include facilities or improvements that would adversely affect transportation systems serving this area of Hawaiʻi.
§226-18 Objectives and policies for facility systems--energy. (a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:	The Pāhala project does not include facilities or improvements that would affect energy systems. Electrical service will be provided by HELCO.
[§226-18.5] Objectives and policies for facility systems--telecommunications. (a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.	The Pāhala project does not include facilities or improvements that would affect telecommunications.
§226-19 Objectives and policies for socio-cultural advancement--housing. (a) Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:	The Pāhala project does not include facilities or improvements that would affect housing.
§226-20 Objectives and policies for socio-cultural advancement--health. (a) Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:	The Pāhala project does not include facilities or improvements that would affect the health of this area of Hawaiʻi.
§226-21 Objective and policies for socio-cultural advancement--education. (a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations	The Pāhala project does include facilities or improvements that would affect the educational opportunities in this area of Hawaiʻi.
§226-22 Objective and policies for socio-cultural advancement--social services. (a) Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.	The Pāhala project does not include facilities or improvements that would affect social services of this area of Hawaiʻi.
§226-23 Objective and policies for socio-cultural advancement--leisure. (a) Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.	The Pāhala project does not include facilities or improvements that would affect the leisure activities.
§226-24 Objective and policies for socio-cultural advancement--individual rights and personal well-being. (a) Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.	The Pāhala project does not include facilities or improvements that would affect individual rights.
§226-25 Objective and policies for socio-cultural advancement--culture. (a) Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaiʻi's people.	The Pāhala project does not include facilities or improvements that would affect the cultural advancement.

Table 6.1
Hawaiʻi State Plan Objectives and Policies

Objectives and Policies of the Hawaiʻi State Plan	Discussion
§226-26 Objectives and policies for socio-cultural advancement--public safety. (a) Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:	The Pāhala project does not include facilities or improvements that would adversely affect public safety of this area of Hawaiʻi.
§226-27 Objectives and policies for socio-cultural advancement--government. (a) Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:	The Pāhala project does not include facilities or improvements that would affect the advancement of government.
§226-101 Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern. [L 1978, c 100, pt of §2; am L 1984, c 236, §14]	The Pāhala project does not include facilities or improvements that would affect overall priority guidelines of statewide concern.

6.1.2 State Functional Plans

The Hawaiʻi State Plan directs appropriate State agencies to prepare Functional Plans to address Statewide needs, problems, and issues through recommended policies and actions. A total of 14 Functional Plans were prepared to implement the State Plan provisions in the areas of agriculture, transportation, conservation lands, education, tourism, water resources, energy, recreation, historic preservation, health, housing, higher education, employment, and human services. The following presents a review of the Functional Plans which are applicable to the proposed project.

(a) Agriculture Functional Plan

Objective B: Achievement of an orderly agricultural marketing system through product promotion and industry organization.

Policy B.2: Encourage the development of Hawaiʻi's agricultural industries.

Objective C: Achievement of optimal contribution by agriculture to the state's economy.

Discussion: Agriculture is the major source of economic activity in Kaʻū. The 2012 Census of Agriculture shows 18,006 acres of land in the state of Hawaiʻi were dedicated to growing macadamia trees, of which 17,378 acres were located in Hawaiʻi County. Though the proposed wastewater treatment and disposal facility project site is currently planted with macadamia trees, the proposed project will have negligible impact on the macadamia industry in Kaʻū as the 14.9-acre project site is relatively small compared to the 17,378 acres dedicated to macadamia production in Hawaiʻi County. Moreover, the project site is situated on poorer-quality agriculture land. According to the Land Study Bureau Agricultural Productivity Ratings Map about 50 percent of the project site is classified as having Good productivity, while the 50 percent has a productivity rating of Poor. Furthermore, according to the Agricultural Lands of Importance to the State of Hawaiʻi Classification System only 20 percent of the treatment and disposal project site is considered Prime Lands with roughly 40 percent deemed Other Lands, while the remaining 40 percent is Unclassified. Overall, the proposed wastewater treatment and disposal facility will be sited and designed to minimize the use of agricultural lands for non-agricultural purposes. Removal of 14.9 acres from macadamia nut production would not adversely affect the total macadamia nut acreage in the state or the County. Further, use of the 14.9-acre area for the treatment and disposal facility will not be contrary to the objective of contribution of agriculture to the state's economy.

(b) Historic Preservation Functional Plan

Objective B: Protection of Historic Properties

Policy B.2. Establish and make available a variety of mechanisms to better protect historic properties.

Objective C: Management and Treatment of Historic Properties

Policy C.3. Explore innovative means to better manage historic properties.

Policy C.4. Encourage proper preservation techniques.

Discussion: The wastewater collection system will be constructed primarily within the existing County streets in the Pāhala community which has been previously disturbed when the streets were constructed. Preliminary analysis shows the treatment and disposal facility will be constructed in an area that does not contain archaeological resources. An Archaeological Inventory Survey (AIS), including subsurface testing, will be conducted to confirm the presence or absence of archaeological resources on the project site.

The contract drawings will state that, should archaeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (SHPD), who will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

6.1.3 State Land Use District

The State Land Use Law, Chapter 205, HRS, is intended to preserve, protect and encourage the development of lands in the State for uses that are best suited to the public health and welfare of Hawaiʻi's people. Under Chapter 205, HRS all lands in the State of Hawaiʻi are classified by the State Land Use Commission into four major categories referred to as State Land Use Districts. These districts are identified as the Urban District, Agricultural District, Conservation District, and Rural District.

Discussion: The treatment and disposal facility is located in the Agricultural District. Uses in the Agricultural District are governed by Chapter 205, Hawaiʻi Revised Statutes. Permissible uses in the Agricultural District are set forth in Chapter 205, HRS, §205-4.5 (7) "Public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings such as booster pumping stations, but not including offices or yards for equipment, material, vehicle storage, repair or maintenance, or treatment plants, or corporation yards, or other like structures".

§205-4.5(b) states: Uses not expressly permitted in subsection (a) shall be prohibited, except the uses permitted as provided in §205-6, Special Permit. §206-6(a) states: subject to this section, the County Planning Commission may permit certain unusual and reasonable uses within agricultural and rural districts other than those for which the district is classified. Any person who desires to use the person's land within an agricultural or rural district other than for an agricultural or rural use, as the case may be, may petition the planning commission of the county within which the person's land is located for permission to use the person's land in the manner desired. Based on the above, the County will apply for a Special Permit which will require approved by the County Planning Commission.

6.1.4 Chapter 344, State Environmental Policy

The State's Environmental Policy is contained in Chapter 344, HRS. The purpose of the Chapter 344, HRS, State Environmental Policy is to *"establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaiʻi."*

§344-3 Environmental policy provides: It shall be the policy of the State, through its programs, authorities, and resources to:

> *Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaiʻi.*
>
> *Enhance the quality of life by:*
>
> *(D) Establishing a commitment on the part of each person to protect and enhance Hawaiʻi's environment and reduce the drain on nonrenewable resources.*

§344-4 Guidelines states. In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:

(2) *Land, water, mineral, visual, air, and other natural resources.*

- *(A) Encourage management practices which conserve and fully utilize all natural resources;*
- *(B) Promote irrigation and waste water management practices which conserve and fully utilize vital water resources;*
- *(C) Promote the recycling of waste water;*

Discussion: One of the purposes of the project is to close the LCCs which have been used for years for disposal of untreated sewage from Pāhala community. Although use of the LCCs has not resulted in known adverse effects to groundwater resources or the drinking water sources for the community, closure of the LCCs will remove this possible source of contamination. Thus, the Pāhala LCC Replacement Project will enhance the groundwater resources in the area. This will be compatible with the objective to prevent or eliminate damage to the environment.

6.1.5 Hawaiʻi Coastal Zone Management Program

The Coastal Zone Management (CZM) Program was created through passage of the Coastal Zone Management Act of 1972. Hawaiʻi's CZM Program, adopted as Chapter 205A, HRS, provides a basis for protecting, restoring and responsibly developing coastal communities and resources. The Hawaiʻi CZM area includes all lands within the State and the areas seaward to the extent of the State's management jurisdiction. Thus, the Pāhala project is located in the CZM area. A discussion of the project's consistency with the objectives and policies of the CZM Program is provided below.

(a) <u>Recreational Resources</u>

<u>Objective</u>:
Provide coastal recreational opportunities accessible to the public.

Policies:

(D) Improve coordination and funding of coastal recreational planning and management; and

(i) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by: Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

Discussion: The Pāhala community is located about 3.8 miles from the shoreline and as such would not affect coastal resources.

(b) Historic Resources

Objective:

(B) Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(D) Identify and analyze significant archaeological resources;

(E) Maximize information retention through preservation of remains and artifacts or salvage operations; and

(F) Support state goals for protection, restoration, interpretation, and display of historic resources.

The wastewater collection system will be constructed primarily within the existing County streets within the Pāhala community which has been previously disturbed when the streets were constructed. Preliminary analysis shows the treatment and disposal facility will be constructed in an area that does not contain archaeological resources. An AIS, including subsurface testing, will be conducted to confirm the presence or absence of archeological resources on the project site.

The contract drawings will state that, should archaeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately and the find shall be protected from further damage. The contractor shall immediately contact the SHPD, who will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

(c) Scenic and Open Space Resources

Objective:

(B) Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(E) Identify valued scenic resources in the coastal zone management area;

(F) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(G) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

(H) Encourage those developments which are not coastal dependent to locate in inland areas.

Discussion: The Pāhala community is located about 3.8 miles from the shoreline and, as such, coastal scenic and open space resources would not be affected.

(d) Coastal Ecosystems

Objective:

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(F) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(G) Improve the technical basis for natural resource management;

(H) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(I) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(J) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: The Pāhala community is located about 3.8 miles from the shoreline and, as such, coastal ecosystems would not be adversely affected.

(e) Economic Uses

Objective:

(B) Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(D) Concentrate coastal dependent development in appropriate areas;

(E) Ensure that coastal dependent developments such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(F) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(iv) Use of presently designated locations is not feasible;

(v) Adverse environmental effects are minimized; and

(vi) The development is important to the State's economy.

Discussion: The Pāhala community is located about 3.8 miles from the shoreline. The collection system and the treatment and disposal facility have been sited in suitable locations to serve the Pāhala community.

(f) Coastal Hazards

Objectives:

(A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies:

(C) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

(D) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

(E) Ensure that developments comply with requirements of the Federal Flood Insurance Program;

(F) Prevent coastal flooding from inland projects.

Discussion: The Pāhala community is located about 3.8 miles from the shoreline. The proposed collection system and treatment and disposal facility do not include improvements related to tsunami, storm waves, stream flooding erosion, subsidence and pollution.

(g) Managing Development

Objective:

(A) Improve the development review process, communication, and public participation in the management of coastal resource and hazards.

Policies:

(D) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(E) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

(F) Communicate the potential short- and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion: In December 2017, a total of 5 community outreach sessions regarding the project were conducted in the Pāhala community which is located about 3.8 miles from the shoreline.

The collection system and treatment and disposal facility does not involve management of coastal resources and hazards.

(h) Public Participation

Objective:

(B) Stimulate public awareness, education, and participation in coastal management.

Policies:

(D) Promote public involvement in coastal zone management processes;

(E) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

(F) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion: In December 2017, a total of 5 community outreach sessions were conducted in the Pāhala community which is located about 3.8 miles from the shoreline.

(i) Beach Protection

Objective:

(A) Protect beaches for public use and recreation.

Policies:

(I) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

(J) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(K) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The Pāhala community is located about 3.8 miles from the shoreline. The collection system and the treatment and disposal facility project does not include improvements which would affect public use beaches.

(j) Marine Resources

Objective:

(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

(L) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(M) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

(N) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(O) Promote research, study, and understanding of ocean processes, marine life, and

other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(P) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The Pāhala community is located about 3.8 miles from the shoreline. The collection system and the treatment and disposal facility project does not include improvements which would affect development of marine and coastal resources.

6.2 Hawaiʻi County Land Use Plans and Policies

6.2.1 Hawaiʻi County General Plan

The existing General Plan was adopted in 2005. According to that plan, a comprehensive review process is to be initiated no more than 10 years after the previous review. A lot has happened on Hawaiʻi Island since 2005, including population growth, natural disasters, technological advancements, and the emphasis on sustainability. These factors are being considered in the 2015 General Plan. The Planning Director is responsible for leading the review process and recommending amendments to the Plan. Since this review has not been completed, the 2005 General Plan will be used for analysis.

The February 2005 General Plan serves as a policy document outlining long range comprehensive development on the island of Hawaiʻi, providing broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future. Purposes of the General Plan include:

- *Guide the pattern of future development in this County based on long-term goals.*
- *Identify the visions, values, and priorities important to the people of this County.*
- *Provide the framework for regulatory decisions, capital improvement priorities, acquisition strategies, and other pertinent government programs within the County organization and coordinated with State and Federal programs.*
- *Improve the physical environment of the County as a setting for human activities; to make it more functional, beautiful, healthful, interesting, and efficient.*
- *Promote and safeguard the public interest and the interest of the County as a whole.*
- *Facilitate the democratic determination of community policies concerning the utilization of its natural, man-made, and human resources.*
- *Effect political and technical coordination in community improvement and development.*
- *Inject long-range considerations into the determination of short-range actions and implementation.*

The planning process utilized for the current comprehensive review and revision of the General Plan included an assessment of the General Plan elements relative to new data, laws, and methods of analysis. Each study element was then analyzed and evaluated in relation to all other elements, County and district goals, and the land use pattern. Potentially, a change in one element could affect other elements as well as the land use pattern. Similarly, a change in County and district goals could potentially be reflected in all elements and in the land use pattern.

The comprehensive review of the General Plan gathered and assessed the data related to each element to identify present conditions and problems and future possibilities. The study elements utilized in the General Plan included the following:

***Economic**: Describes the human, capital, and natural resources used to produce goods and services for consumption in local and overseas markets.*

Energy: *Describes the energy situation for the County and explains the incentive for promoting energy conservation and the development of indigenous energy resources including solar, wind, hydrologic, and geothermal.*

Environmental Quality: *Identifies the factors affecting the island's environmental quality and describes the precautions and safeguards necessary to maintain and improve the quality of the environment for the physical, psychological, and social wellbeing of residents and visitors.*

Flooding and Other Natural Hazards: *Pertains to the conservation and protection of life, improvements, and natural resources from excess runoff due to either man-made improvements, natural causes, or inundation from tsunamis and heavy seas.*

Historic Sites: *Identifies sites and buildings of historical and cultural importance.*

Natural Beauty: *Identifies areas of unique natural beauty that are a principle asset of the island, and encourages programs for their conservation, preservation, and integration with other elements.*

Natural Resources and Shoreline: *Describes the valuable and often irreplaceable natural assets of the island and encourages programs for their proper management and protection.*

Housing: *Addresses the requirements for and the quantity, quality, and distribution of housing units in the County. This element also addresses critical housing problems of the County.*

Public Facilities: *Pertains to the location and distribution of facilities for education, public safety, social, health services and other government operations.*

Public Utilities: *Describes the distribution of power, light, and water; the collection and disposal of solid waste and sewage; and the provision of other communication utilities that are essential to the efficient functioning of a community.*

Recreation: *Examines the requirements of the County for active and passive outdoor activities, cultural events and pastimes, as well as attendant facilities and areas.*

Transportation: *Describes the requirements for air and water transport terminal facilities linking the County with the rest of the State and overseas areas, and the island's network of streets, highways, and roads.*

Land Use: *Studies the relationship of human activities to the uses of land and the location, spatial relationship, and topography. This element is subdivided into the following designations according to uses:*

Agricultural: *Encompasses all types of agricultural endeavors and specified industrial uses, residential and ancillary community and public and accessory uses.*

Commercial: *Comprised of industries in the retail trade and service categories and certain non-noxious enterprises from other industrial classifications.*

Industrial: *Includes uses that may not be compatible with commercial areas (such as manufacturing and processing, wholesaling, large storage and transportation facilities, power plants, and government baseyards) as well as other industrial, manufacturing, or wholesaling uses.*

Multiple Residential: *Includes duplexes, apartments, town houses and similar types of residential structures and ancillary community and public uses.*

Open Space*: Includes conservation lands, forest and water reserves, natural and scientific preserves, and potential natural hazard areas.*

Public Lands*: Includes Federal, State, County, and University owned lands.*

Resort*: Consists primarily of areas with basic amenities and attributes that attract developments of visitor accommodations and related facilities.*

Single-Family Residential*: Consists of single-family detached houses and ancillary community and public uses.*

Discussion: Based on the above, the Pāhala LCC Replacement project will be consistent with the Public Utilities element by providing a wastewater collection system designed to the applicable current standards used by the County. As previously described, the current collection system includes lines located the backyard of many of the parcels in the community. The County must obtain permission from each landowner to access lines on private property to inspect, maintain, repair, or replace the lines. The proposed collection system will be located within the public streets in the community or within accessible easements which allow the County to inspect, maintain, repair or replace the lines, all of which are essential to an efficient functioning community.

Pāhala currently disposes untreated sewage into LCCs, which have been banned by the EPA. The proposed secondary treatment to replace the LCCs consists of aerated lagoons, a subsurface flow wetland, and a disinfection system. The disposal system consists of a slow-rate land application system that is a form of land treatment that is recognized by the EPA. The treatment and disposal facility will provide a system to replace the banned LCCs which will be essential to an efficient functioning community.

The General Plan discusses sewers in Section 11.6. The plan states:

Adequate sewer disposal systems are vital to safeguard public health and preserve the environment. An adequate system is one that minimizes contamination of both the groundwater supply and the coastal waters, beaches and waterborne recreational areas and is not a visual and odor nuisance.

About 77 per cent of the County's population is served by cesspools. There is an increasing need to create a better system than individual cesspools, particularly in highly urbanized and shoreline areas. This is due to the possible pollution of groundwater as well as cesspool seepage into coastal waters. More stringent pollution controls, especially in water quality standards, are being imposed by regulatory agencies. The State Department of Health (DOH) intends to promulgate rules that will prohibit cesspools in the County of Hawaii. [In 2017, the State passed Act 125 requiring all cesspools statewide to be upgraded/closed by 2050.]

Hawaiʻi County presently operates municipal sewerage in Hilo, Pāpaʻikou, Kapehu, Pepeʻekeo and Kealakehe. The remaining communities are served by private wastewater treatment facilities or individual facilities such as cesspools or septic tanks.

In August 1991, the State Department of Health adopted rules that require the use of septic systems in the most critical wastewater disposal areas. Critical wastewater disposal areas are areas around the island where cesspools are permitted. Sewerage disposal system designs must be examined with the particular area in mind. However, it is important to note that the critical wastewater disposal areas may be eliminated in the near future when the State Department of Health implements the prohibition of cesspools.

Specific standards are discussed in Section 11.6.3 Standards which includes the following.

(a) Incorporate sewage works standards proposed in the "Sewerage Study for All Urban

and Urbanizing Areas of the County of Hawaiʻi" and the "Water Quality Management Plan for the County of Hawaiʻi."

(b) Sewerage systems shall be designed for a particular area, depending on topography, geology, density of population, costs, and other considerations of the specific area.

(c) There shall be a minimum of visual and odor pollution emanating from sewerage treatment facilities.

(d) Applicable standards and regulations of the State Department of Health, Chapter 23 "Underground Injection Control."

(e) Applicable standards and regulations of the State Department of Health, Chapter 54 "Water Quality Standards."

(f) Applicable standards and regulations of the State Department of Health, Chapter 55 "Water Pollution Control."

(g) Applicable standards and regulations of the State Department of Health, Chapter 62, HRS, "Wastewater Systems."

(h) Applicable standards and regulations of Chapter 342, HRS; Act 282, Session Laws of Hawaiʻi 1985; and Act 302, Session Laws of Hawaiʻi 1986, Relating to Environmental Quality.

(i) All wastewater disposal systems shall conform to the applicable provisions of Chapter 11-62, Hawaiʻi Administrative Rules for the Department of Health to ensure proper treatment and disposal of wastewater and to prevent further contamination of waterways, underground water sources, and the coastal waters.

Discussion: The proposed secondary treatment to replace the LCCs consists of aerated lagoons, a subsurface flow wetland, and a disinfection system. The disposal system consists of a slow-rate land application system that is a form of land treatment that is recognized by the EPA. The treatment and disposal facility will be designed to meet rules and regulations applicable to the facility which will replace the banned LCCs. The design drawings and related calculations and analysis will be submitted to the DOH for review and comment. The design of the facility will require approval by the DOH before the DOH will issue an approval to operate the treatment and disposal facility.

6.2.2 Kaʻū Community Development Plan

The County of Hawaiʻi General Plan calls for the preparation of community development plans (CDPs) "to translate the broad General Plan statement to specific actions as they apply to specific geographical areas." The Kaʻū CDP is one of nine CDPs for Hawaiʻi County. In October 2017, the Kaʻū CDP was adopted as Ordinance No. 2017-66. The purpose of CDPs is to implement the broad goals within the General Plan on a regional basis and to translate the broad General Plan statements into specific actions. CDPs are the forum for community input into managing growth and coordinating the delivery of government services to the community. CDPs designate detailed development patterns and direct physical development and public improvements by detailing land use policies and infrastructure priorities.

There are two types of County policies in the CDP:

1. "Land Use Policies" are the official land use policy guidance for the Kaʻū CDP planning area and shall be implemented through all County of Hawaiʻi actions. In addition, the Land Use Policies shall inform County recommendations to other agencies, including the State Land Use Commission regarding district boundary amendments, special permits, and other applications in Kaʻū.

There are two aspects of Land Use Policies:

Policy Intent: These are general statements that express policy aims or objectives. From

a legal standpoint, these "hortatory" policies are open to interpretation when applied in specific instances.

Policy Controls: These limit the range of decisions that can be made in the future, like land use policies that specifically designate future settlement or transportation patterns. These binding, sometimes restrictive policy controls often include use of the term "shall," which, from a legal standpoint, means the policy is imperative or mandatory.

The CDP distinguishes these two aspects of Land Use Policy. The applicable one is:

> *2. "County Actions" are the official County policies to guide future County priorities and initiatives, including operating and capital budgets. These policies are not mandated, legally-binding, or self-implementing; rather, they often require additional legislative and administrative directives before being implemented (e.g., land acquisition, capital improvement appropriations, code changes, incentive measures).*

All of the CDP Land Use Policies are designed to preserve the preferred future settlement pattern and achieve the Community Objectives as Kaʻū grows. There are Land Use Policies designed to protect coastal areas, agricultural lands, mauka forests, scenic areas, sensitive ecosystems, cultural resources, and public access. The following Land Use Policies speak more generally to the preservation of the preferred settlement pattern in Kaʻū, including the relative location of residential, commercial, industrial, and resort areas.

A series of 15 policies are shown in the Kaʻū CDP to guide land uses within Pāhala. Figure 6.1 shows the land use policy map for Pāhala.

Policy 1 *Rehabilitate and develop within existing zoned urban areas already served by basic infrastructure, or close to such areas, instead of scattered development.*

Policy 2 *Concentrate commercial uses within and surrounding central core areas in Pāhala, Nāʻālehu, and Ocean View and do not allow strip or spot commercial development outside of the designated urban areas.*

Policy 3 *Commercial facilities shall be developed in areas adequately served by necessary services, such as water, utilities, sewers, and transportation systems. Should such services not be available, the development of more intensive uses should be in concert with a localized program of public and private capital improvements to meet the expected increased needs.*

Policy 4 *Industrial development shall be located in areas adequately served by transportation, utilities, and other essential infrastructure.*

Policy 7 *With the adoption of the Kaʻū CDP, the Land Use Policy Map is adopted as the official policy for the Kaʻū CDP planning area. Future land use decisions in the Kaʻū CDP planning area shall be consistent with the Land Use Policy Map boundaries, designations, and policies herein, unless the CDP and the General Plan are in direct conflict.*

Policy 8 *In the "Low Density Urban (LDU)" Land Use Policy Map category in the Kaʻū CDP planning area, changes of zone shall only be permitted to Single-Family Residential (RS), Multiple-Family Residential (RM-7.5 or higher), Residential-Commercial Mixed Use (RCX-7.5 or higher), or Open (O).*

In Pāhala, this policy supports a rezone of TMKs (3)9-6-002:016 & 023:034 from Agricultural (A-1a) and Industrial (ML-20 and MG-1a) to RS and/or O to take advantage of existing water and road infrastructure.

Policy 9 *If infill capacity is exceeded in areas designated "Low Density Urban (LDU)" on*

the Land Use Policy Map in Pāhala, it would be appropriate to designate TMK (3)9-6-005:001 as LDU to take advantage of existing water and road connections.

Policy 39 *The urban growth boundary between agricultural areas (designated "Important Agricultural Land" or "Extensive Agriculture") and developed areas (designated "Rural," "Low/Medium/High Density Urban," "Industrial," or "Resort") is parcel-specific in the Kaʻū CDP planning area, except at Punaluʻu and the Low/Medium Density Urban and Industrial nodes in Ocean View. Areas outside designated developed areas shall be preserved as agricultural lands, open space, scenic view planes, and natural beauty areas, unless the CDP and the General Plan are in direct conflict.*

Policy 44 *Through permit conditions, development agreements, deed restrictions, and/or other means, ensure that areas in the "Important Agricultural Land" and "Extensive Agriculture" Land Use Policy Map categories continue to be utilized for agricultural uses and not for speculative or other residential development.*

Policy 69 *Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaiʻi.*

Policy 70 *Protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.*

Policy 71 *Review and comment by DLNR's State Historic Preservation Division (SHPD) shall be requested for any permit or entitlement for use which may affect any building, structure, object, district, area, or site that is over fifty years old, except as provided in HRS section 6E-42.2.*

Policy 72 *In the "Low Density Urban" (LDU) and "Medium Density Urban" Land Use Policy Map categories, in those cases where provisions of the zoning and subdivision codes are inconsistent with the character of surrounding neighborhoods, variances or PUDs that maintain consistent village/town character should be encouraged.*

Policy 73 *The development of commercial facilities should be designed to fit into the locale with minimal intrusion while providing the desired services. Appropriate infrastructure and design concerns shall be incorporated into the review of such developments.*

Policy 74 *As appropriate to maintain community character while also accommodating drainage, walkability, maintenance, and other site-specific needs when improving existing roads in Pāhala, Nāʻālehu, and Waiʻōhinu, retain the current road design, including pavement width and lack of curbs, gutters, sidewalks, or paved shoulders and swales.*

Policy 75 *As appropriate to maintain community character while also accommodating drainage, walkability, maintenance, and other site-specific needs, new roads (both public and private) in the Kaʻū CDP planning area may be constructed without curbs, gutters, sidewalks, or paved shoulders and swales.*

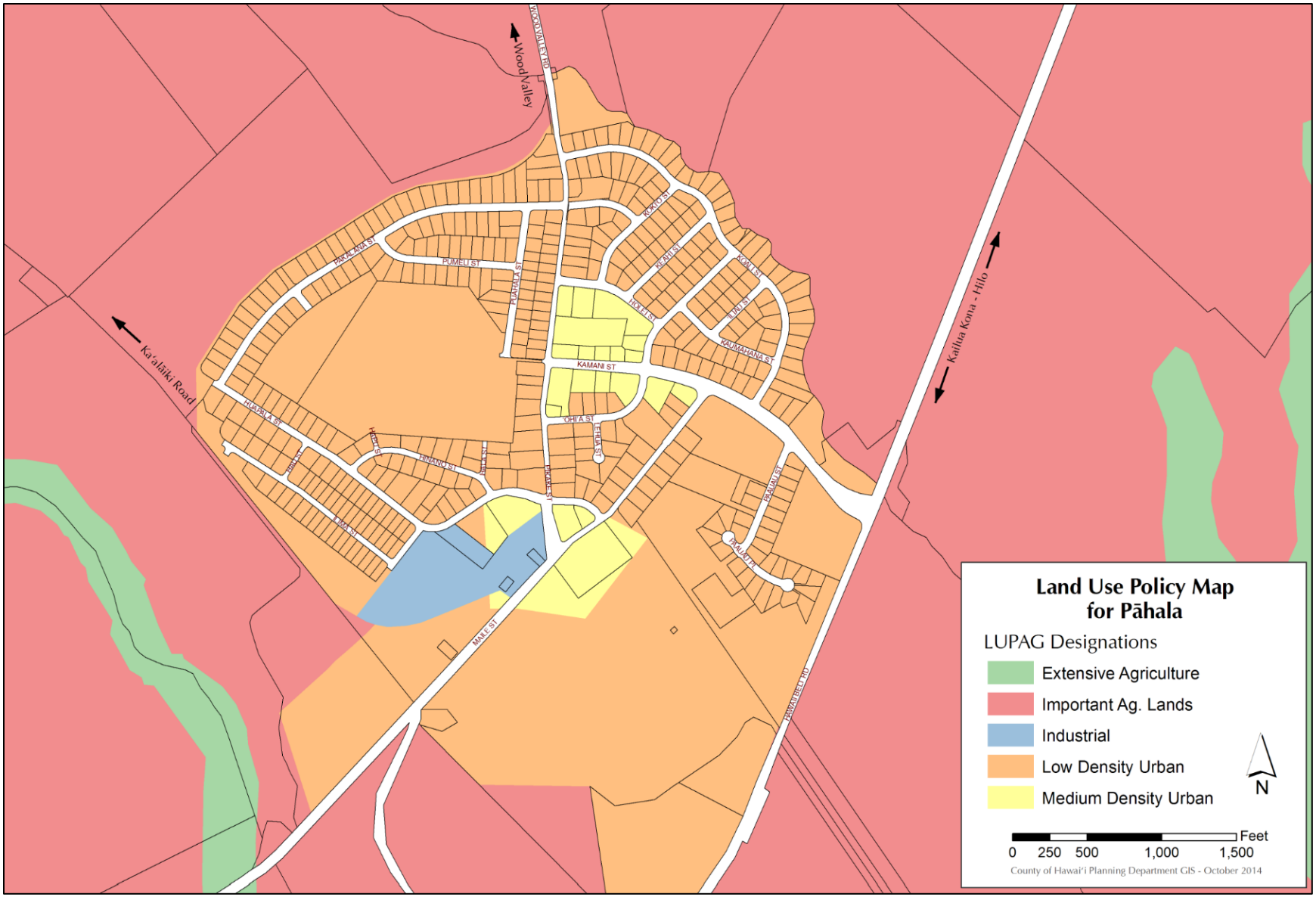


Figure 6.1. Community Development Plan Land Use Policy Map

Discussion: The Pāhala LCC Replacement Project is consistent with land uses policies as the improvements are designed to serve the designated areas shown in the Land Use Policy Map, which shows Pāhala as primarily low density urban. The collection system and the treatment and disposal facility will be consistent with the policy related to infill of commercial development within the Pāhala community. The collection system improvements are consistent with the policy to maintain the community character as the improvements will retain the existing pavement, including retention of streets, shoulders, and drainage systems.

Section 4.3 of the CDP protects agricultural land and open space from non-agricultural development with the CDP Land Use Policy Map, urban growth boundaries, limits on Special Permits and lots sizes, and restrictions on residential development. It also prioritizes agricultural subdivision standards, revisions in water catchment variance rules, stronger farm dwelling regulations and tax incentive programs, development of transfer of development rights and land bank programs, State Important Agricultural Land designations, and expedited lot consolidation in existing rural subdivisions.

Policy 40 Special permits of any kind in the "Important Agricultural Land" and "Extensive Agriculture" Land Use Policy Map categories should not be permitted in the Kaʻū CDP planning area, except for the following uses (as defined in HCC chapter 25):

- *Agriculture and Related Economic Infrastructure: Animal hospitals, Veterinary establishments, Fertilizer yards utilizing only manure and soil, for commercial use*
- *Cottage Industry related to Agriculture: Bed and breakfast establishments, Guest ranches, Lodges, Home occupations*
- *Community Facilities: Community buildings, Public uses and structures, Shooting ranges, ATV courses (in areas without cultural, natural resource, or scenic value)*
- *Quarries whose permit conditions address geotechnical, engineering, safety, private road use, oversight, and any site-specific issues.*
- *Urban Uses in Ocean View: Uses consistent with the LDU, MDU, and Industrial LUPAG categories indicated on the Kaʻū CDP Land Use Policy Map in Ocean View, until the SLU boundaries are amended (from Agriculture to Urban).*

The Planning Commission shall also include in any Special Permit approval (or recommend for approval to the State Land Use Commission) appropriate performance conditions to achieve CDP objectives and implement CDP policies. (HRS 205-6(c) and Planning Commission Rules 6-3(a)(5)(G), 6-7, & 6-8)

Discussion: The collection system and the treatment and disposal facility will be owned the County of Hawaiʻi and managed and operated by the County of Hawaiʻi Department of Environmental Management. As such, the improvements will be a public use and structure. The Department of Environmental Management will file a Special Permit for review and approval by the Planning Commission.

Section 5 of the CDP prioritizes improvements in infrastructure, facilities, and services, including Section 5.8 applicable to Environmental Management as shown below.

- *Environmental management facilities, including expanded sewer lines, the Ocean View transfer station, green waste facilities, and improvements in the Pāhala transfer station*

Policy 120 Extend the primary wastewater collection lines in Pāhala and Nāʻālehu so that infill development projects can connect wastewater systems built for new

subdivisions to the County systems.

Discussion: The collection system will be consistent with policy 120 as the improvements for the Pāhala LCC Replacement Project have been designed to accommodate the Pāhala community. Similarly, the treatment and disposal facility has been designed to accommodate the wastewater flows from the collection system from the Pāhala community.

6.2.3 County of Hawaiʻi Zoning

Chapter 25 of the Hawaiʻi County Code (HCC) regulates land use in accordance with adopted land use policies. The County Code presents permitted uses and structures, development standards, and height controls for each zoning district.

The treatment and disposal facility will be owned the County of Hawaiʻi and managed and operated by the County of Hawaiʻi Department of Environmental Management. The treatment and disposal facility would be a "public use" as defined by the HCC Chapter 25, Zoning, Section 25-1-5, as a use conducted by or a structure or building owned or managed by the federal government, the State of Hawaiʻi or the County to fulfill a governmental function, activity or service for public benefit and in accordance with public policy.

HCC Section 25-2-71 (c)(1) states: *Plan approval shall be required in all applicable districts prior to the construction or establishment of public uses, structures and buildings and community buildings, as permitted under section 25-4-11.*

HCC Section 25-4-11(c) states: *Public uses, structures and buildings and community buildings are permitted uses in any district, provided that the director has issued plan approval for such use.*

6.2.4 County of Hawaiʻi Special Management Area

Pursuant to the Hawaiʻi CZM Program, Chapter 205A, HRS, the counties have enacted ordinances establishing Special Management Areas (SMAs). Any "development" within the SMA requires an SMA Use permit administered by the County of Hawaiʻi Planning Department. Through the SMA permit system, the County assesses and regulates developments proposed for areas located within the SMA. The Pāhala LCC Replacement Project is located within the Pāhala community which lies about 3.8 miles from the shoreline area. As such, the project will not be subject to requirements of an SMA use permit.

THIS PAGE INTENTIONALLY LEFT BLANK

7 PUBLIC PARTICIPATION

A community outreach program is being conducted to exchange information about the Pāhala LCC replacement project and to work with affected residents and the general community on how to implement the project on both personal and community levels.

These talk story sessions are designed to optimize community conversations in informal and comfortable sessions. The first round of community outreach on the current effort to implement the Pāhala LCC replacement project included five sessions as follows:

1. Tuesday, December 12, 2017 at 6:00 PM – Kaʻū Gym Multi-Purpose Conference Room
2. Wednesday, December 13, 2017 at 10:00 AM – Pāhala Community Center
3. Wednesday, December 13, 2017 at 6:00 PM – Pāhala Community Center
4. Thursday, December 14, 2017 at 10:00 AM – Kaʻū Gym Multi-Purpose Conference Room
5. Thursday, December 14, 2017 at 6:00 PM – Pāhala Community Center

The target outcomes for the first round of engagement were the following:

- **Assure residents the project team was there to listen**. In these talk story sessions, the project team emphasized the need to listen to understand the community and how to continue conversations. Further, the project team stressed in each session that these community outreach discussions are taking place very early in the planning and implementation process. Hence, it was stressed that, while there may be limited information at this time, the team was there to listen and convey questions and comments to DEM. That way, in the next round of meetings, DEM will be able to provide more information to address community concerns.
- **Help residents understand what is being proposed**. It was important to present project information in ways that are simple, accurate, relevant and conducive to continuing dialogue.
- **Establish a point of departure to move towards future actions and solutions**. Pāhala residents have had different experiences with wastewater disposal over the years. For some, they transitioned from a plantation-operated system to a County-run operation. For others, they installed their own systems. The talk story sessions were intended to clearly differentiate between previous efforts and the current proposed project.
- **Comply with EPA deadline of December 15, 2017, to hold initial public meeting**. DEM and EPA established a schedule for completion of key milestones. The talk story sessions comprised several initial public meetings and were organized to comply with this schedule. The approach was intended to initiate a process that engages all Pāhala residents, while recognizing that the project will affect some people directly during construction and operation of the new collection system and new wastewater treatment and disposal facility.

Invitations and announcements for the talk story sessions were intended to reach all audiences, as follows:

- Property owners with C. Brewer lines on their property were mailed letters from DEM inviting them to these sessions. The letters included stamped, mail-in postcards to facilitate the RSVP process.

- Fliers were hand-delivered to "newly-accessible properties."
- Organizational leaders were provided copies of fliers announcing meetings and asked to circulate among their members.
- Fliers were posted in public venues, such as the post office, the Pāhala Community Center and the Kaʻū Hospital.
- Several online announcements were included in Kaʻū News Briefs available at http://haunewsbriefs.blogspot.com/.

The format for each meeting was as follows:

1. **Introductions and Pāhala relationship**: Participants were asked to introduce themselves and describe their relationship to Pāhala. They were encouraged to talk about generational presence, length of residence, schools and so on.
2. **Life in Pāhala**: Participants were asked to discuss:
    - What they valued most about Pāhala;
    - Pāhala's biggest challenges; and
    - Their ideas and vision for the future of Pāhala.
3. **Experience with the existing sewer system**: Participants were asked to share their recollections and experience with wastewater disposal in Pāhala. They were also asked to share what they knew about the proposed project.
4. **The proposed project**: Project background and overview were presented in a slide presentation.
5. **Questions and comments**: Project representatives encouraged participants to ask questions and voice their reactions.
6. **What one message do you want DEM to hear?** Each participant was asked to share "one thing" that they wanted to share with the County.

This first round of community outreach met the following objectives:

- Residents understood the project team was there to listen. Participants responded enthusiastically to questions about Pāhala, and openly discussed previous experience with wastewater disposal in their town and concerns and views about the proposed project. When the project team could not respond to questions, participants were assured that their comments were noted and there will be follow up.
- Those who attended appeared to have acquired at least a rudimentary understanding about how the new collection, treatment, and disposal system would work. They were able to ask questions about transmission of wastewater to the treatment and disposal facility, and how the lagoons and land disposal system would work. Participants indicated they knew that this system is different from wastewater disposal systems they may have previously experienced.
- Participants were able to discuss their understanding, or lack thereof, of the wastewater system and their own personal situation. By the end of each session, they expressed understanding that the proposed project is a departure from previous discussions and current operations.
- The milestone date for an initial community meeting (December 15, 2017) was met.

Online and paper versions of the Kaʻū News Briefs and the Kaʻū News Calendar reported on these meetings.

The proposed project was modified in response to the community input received and is described in this Draft EA. A second round of meetings with the community is planned to be conducted in concert with the Draft EA public review and comment period.

Based on the first round of community outreach, the following community outreach activities are being conducted to continue to engage constructive and meaningful community input.

- **Information Follow-up**. Project representatives made a commitment to follow up on topics raised in the first round of community outreach. The following lists how topics are addressed in this Draft EA or other forms of communication.
    - *Site selection process.* Several participants asked why the tentative site was selected and suggested other sites. It is recommended that a summary table of previously considered sites and selection rationale, as well a related map, be presented. See Section 2 for site selection discussion.
    - *Flooding at tentative site.* Participants claimed that this site is prone to flooding. If possible, there should be some response. See Section 3.9 for further discussion.
    - *Cost range and homeowner assistance possibilities.* Property owner participants had many questions about how project implementation would affect them financially and personally. In response, the DEM is convening separate meetings with property owners of 1) former C. Brewer properties with sewer lines that will connect to the proposed collection system and 2) "Newly accessible" properties that front roadways in which new sewer lines will be located. Hawaiʻi County Code, Chapter 21, Sewers, Section 21-5 requires that when new sewer lines are placed in public roadways, properties fronting such roadways must connect to these lines.
    - *Clarification on sewer fee structure.* There was often confusion about who pays what and why. Information on the fee structure should be presented clearly.
    - *Short-and long-term Impact on macadamia nut cultivation.* It is recommended that a preliminary order of magnitude cost of project impact be estimated and presented in terms of the overall macadamia nut cultivation operation in Pāhala. Further, the project team should describe, in general terms, the possible lease arrangements with the future macadamia nut operator.
    - *Conceptual plan of full buildout*. Participants were concerned that the tentative site is not large enough to support serving all Pāhala, while still maintaining visual buffers. It is recommended that a very preliminary schematic be presented that shows full buildout. As discussed in Section 4.1, the Kaʻū Community Development Plan calls for expansion to accommodate future needs but does not present a timeline for this expansion. As of this writing, no substantial planning or scoping of a collection system expansion has been conducted and this expansion is unlikely to occur within the next 10 to 20 years. This action was therefore excluded from the analysis of cumulative improvements and impacts.
- Other topics raised in the first round of community outreach tended to be related to details that will be determined as the project nears implementation. These topics are as follows, and information will be shared with the community when it becomes available.
    - *Conditions of existing pipes.* Participants raised questions about what was on their property and possible problems. It is recommended that information on previous

County evaluation and potential future assessments be made available prior to or during construction.

- *Possible land application trees.* Some information has already been provided, and status of selecting trees should be provided.
- *Fencing around perimeter of wastewater treatment and disposal facility*. Options for fence location, height, and materials should be provided.
- *Tour of Honokaa wastewater treatment plant*. Residents showed interest in attending a tour of the Honokaa plant with DEM and the project team.

- **Next Round of Meetings**. The next round of community meetings will be conducted upon publication of the Draft EA:
  - *Information meeting on the Draft EA*. The community will have two opportunities to provide comments on this Draft EA. First, public notification will be posted in local media, public venues, and mailed to property owners directly affected by the Proposed Action. These notifications will include how the public can access the Draft EA on the OEQC website and submit comments. Second, COH DEM will convene a voluntary and optional informational meeting intended to provide an additional opportunity for public comments.
  - *Meeting with property owners who will be directly affected by the proposed project.* As noted earlier, COH DEM will be convening separate meetings with property owners of 1) former C. Brewer properties with sewer lines that will connect to the proposed collection system and 2) “newly accessible” properties that front roadways in which new sewer lines will be located. The purpose of these meetings is to discuss how the proposed project will affect individual property owners in terms of cost, financing and logistics, such as construction timing and activities.

8 FINDINGS AND DETERMINATION

8.1 Chapter 343, Hawaiʻi Revised Statutes (HRS) – Department of Environmental Management (DEM) Anticipated Finding of No Significant Impact (FONSI)

Short-term construction impacts include disruption to the project site and surrounding areas during construction, decline in air quality from construction activities, and increase in noise levels. Once construction has been completed, the short-term adverse impacts will no longer occur.

Based on analysis of the impacts, the County anticipates a FONSI for the Pāhala Large Capacity Cesspool (LCC) Replacement Project. The significance criteria to make this determination are set forth below and in Hawaiʻi Administrative Rules Title 11, State of Hawaiʻi Department of Health (DOH), Chapter 200, Environmental Impact Statement Rules.

8.1.1 Significance Criteria

1) Involve an irrevocable commitment to loss or destruction of any natural or cultural resources;

The Pāhala LCC Replacement Project collection system and treatment and disposal facility sites do not provide habitat for federal or State of Hawaiʻi listed or candidate threatened or endangered species of flora or fauna. The collection system will be constructed primarily within areas that were disturbed during construction of the existing County streets, plus two short segments within easements in the Pāhala community. The treatment and disposal facility site has previously been cleared, graded, and planted with a macadamia nut orchard. Thus, the proposed use of the Pāhala LCC Replacement Project sites will not result in the loss or destruction of natural resources.

Preliminary analysis shows the treatment and disposal facility will be constructed in an area that is unlikely to contain archaeological resources due to historical ground modifications. However, an Archaeological Inventory Survey (AIS), including subsurface testing, is planned for September 2018 to test for the presence of archaeological resources on the project site. Following completion of the AIS, and in accordance with Section 106 of the National Historic Preservation Act (NHPA), the County and the U.S. Environmental Protection Agency (EPA) will continue to consult with the Hawaiʻi State Historic Preservation Division (SHPD) to determine whether additional mitigation measures are appropriate to avoid or minimize adverse effects to archaeological resources.

The contract drawings will state that, should archaeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts, burials, or concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately and the find shall be protected from further damage. The contractor shall immediately contact the Hawaiʻi SHPD (at 808.981.2979), who will assess the significance of the find and recommend appropriate mitigation measures, if necessary.

Based on the above, and contingent on the findings of the AIS, construction of the wastewater treatment and disposal facility and related improvements is not expected to result in the loss or destruction of historic sites or cultural resources.

2) Curtail the range of beneficial uses of the environment;

The Pāhala LCC Replacement Project sites will use lands within the Pāhala community that have been used for County streets and planted with a macadamia nut orchard for a number of years. The treatment and disposal facility will occupy a total area of about 14.9 acres within a portion the

macadamia nut orchard. The remainder of the orchard will still be available for the production of macadamia nuts. Thus, the Pāhala LCC Replacement Project will not curtail the beneficial uses of the environment.

3) Conflict with the State's long-term environmental policies or goals as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

The Pāhala LCC Replacement Project will not involve actions or activities that would adversely affect natural resources of the project sites. The Pāhala LCC Replacement Project will be consistent with the guidelines of Chapter 344, HRS, as it will provide treatment and disposal for wastewater from the Pāhala community. Moreover, the Pāhala LCC Replacement Project will construct a wastewater collection system according to County standards and a treatment and disposal facility according to DOH guidelines. Lastly, the Pāhala LCC Replacement Project will allow closure of LCCs that have been used to dispose untreated sewage into the subsurface. As such, the Pāhala LCC Replacement Project will not conflict with the State's long-term environmental policies or goals as expressed in Chapter 344, HRS.

4) Substantially affect the economic or social welfare of the community or state;

The Pāhala LCC Replacement Project will allow the County to provide wastewater collection, treatment and disposal facilities meeting the needs of the Pāhala community. It will be an integral part of the infrastructure needed to maintain the health and welfare of the Pāhala community. Therefore, the Pāhala LCC Replacement Project will have a beneficial impact on the economic and social welfare of the community.

5) Substantially affect public health;

Pāhala LCC Replacement Project will involve the design, construction and operation of wastewater collection, treatment and disposal facilities that will maintain and enhance the public health of the Pāhala community. Thus, the Pāhala LCC Replacement Project will have a beneficial effect on public health.

6) Involve substantial secondary impacts, such as population changes or effects on public facilities;

The Pāhala LCC Replacement Project will be a public facility serving the Pāhala community. For the most part, construction of the Pāhala LCC Replacement Project is expected to involve the use of local contractors, which means that there will not be an extensive secondary effect on the population of the Island of Hawaiʻi or the Pāhala community. Thus, construction of the Pāhala LCC Replacement Project will not create secondary impacts, such as population changes or effects on public facilities.

7) Involve a substantial degradation of environmental quality;

The Pāhala LCC Replacement Project is anticipated to result in short-term impacts to noise, air quality, and traffic in the immediate vicinity of the project site during the period of construction. The collection system and the treatment and disposal facility sites do not contain federal or State-listed or candidate threatened or endangered species of flora or fauna. As discussed under Criterion #1, the project is not expected to result in the loss or destruction of historic sites or cultural resources, contingent on the outcome of the NHPA Section 106 consultation and findings of the AIS.

Based on the above findings, the Pāhala LCC Replacement Project will not result in a substantial degradation of environmental quality.

8) Have a cumulative effect upon the environment or involves a commitment for larger actions;

The Pāhala LCC Replacement Project does not involve a commitment to further actions to other County of Hawaiʻi related projects in the vicinity. As a result, the Pāhala LCC Replacement Project will not have a cumulative effect upon the environment or involve a commitment by the County to larger actions.

9) Affect a rare, threatened or endangered species;

The Pāhala LCC Replacement Project sites do not contain federal or State-listed or candidate threatened or endangered species of flora. Also, the Pāhala LCC Replacement Project sites do not provide habitat for federal or State-listed or candidate threatened or endangered species of fauna. Thus, the Pāhala LCC Replacement Project sites will not affect a threatened or endangered species.

10) Detrimentally affect air or water quality or ambient noise levels;

Operation of construction equipment will increase noise and exhaust emission levels in the immediate vicinity of the Pāhala LCC Replacement Project sites during the construction period. Once construction has been completed, the Pāhala LCC Replacement Project will contribute almost no additional noise or air emissions to the local area or detrimentally affect air or water quality. The treatment and disposal facility will include an odor control system to limit odors typically associated with a wastewater treatment facility.

11) Affects or likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geographically hazardous land, estuary, fresh water or coastal water;

The Flood Insurance Rate Map (FIRM), Community Panel No. 155166 1800F, effective date September 29, 2017 shows the Pāhala area is located in Zone X, area of minimal flood hazard above the 500-year flood level. This was confirmed by the County of Hawaiʻi Department of Public Works. A small portion of the collection system site is located within the Zone X defined as areas of 0.2-percent annual chance flood; areas of 1-percent annual chance flood with average depths of less than 1 foot.

The Pāhala LCC Replacement Project sites are not located within the tsunami evacuation zone. The sites are also outside of the County of Hawaiʻi Special Management Area and coastal shoreline area. Thus, the Pāhala LCC Replacement Project sites are not located in an environmentally sensitive area.

12) Substantially affect scenic vistas and viewplanes identified in county or state plans or studies;

The wastewater collection system will be within the County roadways beneath the surface of the travelways. Thus, the collection system will not affect viewplanes in the Pāhala area.

The treatment and disposal facility will consist of an operations building, headworks with a cover structure, aeration lagoons, subsurface constructed wetlands, and a series of slow-rate land application basins with planted trees. The operations building, headworks cover structure, and low berms around the basins will be the only above-grade structures. The existing pine trees along Maile Street, most of which will remain with no changes, will continue to obstruct the viewplanes from Maile Street. The facility site will be adjacent (makai) to, and visible from, Māmalahoa Highway (State Route 11); however, impacts to the viewplane will be mitigated by the planted trees in the basins and by the rise in elevation between the highway and the facility. Thus, development of the Pāhala LCC Replacement Project sites will not present an adverse impact to the public views from other areas.

13) Require substantial energy consumption.

The Pāhala LCC Replacement Project is a new facility that will be planned and designed to minimize use of electrical power. Thus, it will not create a substantial increase in energy consumption.

8.1.2 Determination

Based on these findings and the assessment of potential impacts from the Pāhala LCC Replacement Project, the project does not require preparation of an Environmental Impact Statement and a FONSI is anticipated.

8.2 National Environmental Policy Act – EPA Preliminary Finding of No Significant Impact (FONSI)

In 2006, a U.S. Environmental Protection Agency (EPA) Special Appropriation Grant was awarded to the County of Hawaiʻi for the Kaʻū Large Capacity Cesspool (LCC) Replacement Project Grant (XP-96942401). The grant's federal funding amount is $1.842 million and currently expires in October 2020. The purpose of the award is for the design and construction of wastewater system improvements to replace LCCs in the Kaʻū District. The grant award and current work plan provide funding to replace the LCCs serving the Pāhala community.

EPA's award of a grant for the Pāhala LCC Replacement Project is a federal action requiring compliance with the National Environmental Policy Act (NEPA), 42 USC §§4321-4370f. In accordance with NEPA, Council of Environmental Quality Regulations at 40 CFR §§1500.1-1508.28, and EPA NEPA regulations at 40 CFR Part 6, EPA and the County have prepared a Draft Environmental Assessment (EA) describing the potential environmental impacts associated with, and the alternatives to, the proposed project. This preliminary FONSI documents EPA's finding that the proposed project is not expected to have a significant effect on the environment. In accordance with 40 CFR 6.203(b)(1), this preliminary FONSI is being made available for public review and comment prior to EPA making a decision on the proposed action.

8.2.1 Project Location and Description

The Pāhala LCC Replacement Project is located within and immediately south of the community of Pāhala, which is about 52 miles southwest of Hilo, in the Kaʻū District, Island of Hawaiʻi. Pāhala is located west (mauka) of Māmalahoa Highway (State Route 11) about 3.8 miles from the shoreline. Most of the community lies between 980 feet above mean sea level (msl) on the western end and approximately 800 feet above msl on the eastern end.

Under the Pāhala LCC Replacement Project, the County of Hawaiʻi will perform the following actions:

1) Acquire, or otherwise obtain the right to develop and use, a portion of a 42.5-acre site (identified as "Site 7") that is currently owned by Kamehameha Schools, then construct a new secondary wastewater treatment and disposal facility within a portion of the parcel;
2) Construct a new wastewater collection system, primarily within the public right-of-way and two short segments within easements in the Pāhala community, to collect and convey sanitary waste from the residential lots to the new wastewater treatment and disposal facility;
3) Close and abandon two LCCs, according to DOH closure procedures; and
4) Abandon the existing wastewater collection system in place.

8.2.2 Purpose and Need for Proposed Project

The purpose of the Pāhala LCC Replacement Project is to enable the County to comply with the Safe Drinking Water Act (SDWA) and to fulfill the compliance provisions of the June 2017 Administrative Order on Consent (AOC) between EPA and the County with respect to closure of the Pāhala LCCs by June 2021.

The need for action is driven by the public health and environmental concerns associated with LCCs. Cesspools can release disease-causing pathogens and other pollutants (e.g., nitrates) into ground water aquifers, streams, and eventually the ocean, thus leading to public health and environmental concerns.

8.2.3 Environmental Consequences

In compliance with NEPA, EPA has prepared a Draft EA that analyzes the environmental impacts of the Pāhala LCC Replacement Project. After considering a wide range of regulatory, environmental (both natural and human) and socio-economic factors, the Draft EA did not identify any significant impacts to the environment that will result from the implementation of the proposed project.

The collection system will be constructed primarily within areas that were disturbed during construction of County streets, plus two short segments within easements in the Pāhala community. The treatment and disposal facility site has previously been cleared, graded, and planted with a macadamia nut orchard. The affected sites do not provide habitat for federal or State of Hawaiʻi listed or candidate threatened or endangered species of flora or fauna. A biological field survey in August 2018 did not identify any native mammalian or avian species within Site 7, though the endangered Hawaiian Petrel (*Pterodroma sandwichensis*) and the threatened Newell's Shearwater (*Puffinus newelli*) have been recorded flying over the general area between April and the end of November each year. Consultation with the U.S. Fish and Wildlife Service is ongoing, and the construction and design of the wastewater treatment and disposal facility will incorporate impact avoidance measures as necessary to avoid or minimize adverse effects to protected avian species.

Preliminary analysis shows the wastewater treatment and disposal facility will be constructed in an area that is unlikely to contain archaeological resources due to historical ground modifications. However, an AIS, including subsurface testing, is planned for September 2018 to test for the presence of archaeological resources on the project site. Consultation with the Hawaiʻi State Historic Preservation Division is ongoing, in accordance with Section 106 of the National Historic Preservation Act (NHPA), and construction of the wastewater treatment and disposal facility will incorporate additional mitigation measures as necessary to avoid or minimize adverse effects to archaeological resources. Contingent on the outcome of the NHPA Section 106 consultation and findings of the AIS, construction activities are not expected to result in adverse effects to historic properties.

Consultation letters were delivered to invite comments from organizations that may attach religious or cultural significance to properties affected by the proposed action. A total of 15 letters were mailed to various Native Hawaiian Organizations requesting comments. As of August 2018, no responses have been submitted to the County.

The Pāhala LCC Replacement Project will allow the County to provide wastewater collection, treatment and disposal facilities meeting the needs of the Pāhala community and will have a beneficial impact on the economic and social welfare of the community. The proposed action will not result in population changes in the Pāhala area. The proposed action will result in minor, short-term impacts to noise, air quality, and traffic in the immediate vicinity of the project site during the period of construction; however, operation of the wastewater treatment and disposal

facility will contribute almost no additional light pollution, noise, or air emissions to the local area or detrimentally affect air or water quality. The facility will include an odor control system to limit odors typically associated with a wastewater treatment facility.

After carefully considering the regulatory, environmental (both natural and human), and socioeconomic factors as described in the Draft EA, EPA has not identified any significant impacts to the environment that will result from implementation of the proposed project.

9 LIST OF PERMITS AND APPROVALS

State of Hawaiʻi Department of Health

Approval to Construct

Approval to Use

National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit

Underground Injection Well Abandonment

Noise Variance (only if required)

County of Hawaiʻi

Special Permit

Plan Approval

Grading Permit

Building Permit

Fence Permit

Street Usage Permit

THIS PAGE INTENTIONALLY LEFT BLANK

10 CONSULTED PARTIES

10.1 Pre-Assessment Consultation

In accordance with the requirements of Hawai'i Administrative Rules Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 9, Early Consultation, the following agencies were consulted during the pre-assessment phase of the Draft Environmental Assessment. Each agency was sent a copy of a project summary and a request for their written comments on the project. Those who formally replied are indicated with a ▲. All written comments and responses are reproduced in Appendix A.

Federal

- ▲U.S. Army Corps of Engineers (COE)
- ▲U.S. Fish and Wildlife Service (FWS)
- U.S. Department of Agriculture National Resources Conservation Service
- National Oceanic and Atmospheric Administration (NOAA)
- National Park Service Hawaiʻi Volcanoes National Park

State of Hawaiʻi

- Department of Agriculture
- Department of Business, Economic Development and Tourism (DBEDT)
  - DBEDT, Hawaiʻi State Energy Office
  - DBEDT, Land Use Commission
  - ▲DBEDT, Office of Planning
- ▲Department of Accounting and General Services
- Hawaiʻi Emergency Management Agency
- Department of Health (DOH)
  - DOH, Office of Environmental Quality Control
  - DOH, Office of Director
  - DOH, Environmental Management Division
  - ▲DOH, Environmental Planning Office
  - ▲DOH, Clean Water Branch
  - ▲DOH, Safe Drinking Water Branch
  - ▲DOH, Wastewater Branch
- ▲Department of Land and Natural Resources (DLNR)
  - ▲Engineering Division

▲Division of Forestry and Wildlife
Historic Preservation Division
Commission on Water Resources Management
Office of Hawaiian Affairs
▲Department of Transportation
▲Department of Hawaiian Home Lands
University of Hawaiʻi, Environmental Center
Hawaiʻi State Library
Hilo Regional Library

County of Hawaiʻi

▲Hawaiʻi Fire Department
Department of Parks and Recreation
▲Planning Department
▲Police Department
▲Department of Public Works
▲Department of Water Supply

Elected Officials

Congresswoman Tulsi Gabbard
State Senator Russell Ruderman
State Representative Richard H.K. Onishi
Councilmember Maile Medeiro

Native Hawaiian Organizations

Hawaiʻi Island Burial Council
Association of Hawaiian Civic Clubs
Charles Pelenui Mahi ʻOhana
Friends of ʻIolani Palace
Hawaiian Civic Club of Hilo
Kamehameha Schools
Kanu o kaʻĀina Learning ʻOhana
Koʻolau Foundation
Makuʻu Farmers Association
Na Koa Ikaika Ka Lāhui Hawaiʻi

Office of Hawaiian Affairs

Pacific Agricultural Land Management Systems

Partners in Development Foundation

Piʻihonua Hawaiian Homestead Community Association

Other

Hawaiʻi Gas

Hawaiian Electric Light Company

Hawaiian Telcom

Spectrum Hawaiʻi

Mr. Stason Nishimura

Mr. Lance Uno

Ms. Julia Neal

10.2 Agencies and Organizations Consulted on the Draft EA

Availability of the Draft EA for review and comment will be published in the Office of Environmental Quality Control (OEQC) *Environmental Notice* dated September 23, 2018. EPA will directly notify the agencies, organizations, and individuals listed in Section 10.1 regarding the availability of the Draft EA for review and comment. Legal notice will be posted in the Hawaiʻi Tribune Herald, West Hawaiʻi Today, and Kaʻū News Brief. Additionally, EPA and the County of Hawaiʻi will continue to consult with the Hawaiʻi State Historic Preservation Division in accordance with Section 106 of the National Historic Preservation Act, and with the U.S. Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act.

THIS PAGE INTENTIONALLY LEFT BLANK

11 REFERENCES

Atlas of Hawaiian Watersheds & Their Aquatic Resources, Island of Hawaii, Bishop Museum & Division of Aquatic Resources. 1262 p. (3 volumes). Parham, J.E., G. R. Higashi, E. K. Lapp, D. G. K. Kuamoʻo, R. T. Nishimoto, S. Hau, J. M. Fitzsimons, D. A. Polhemus, and W. S. Devick. 2008.

County of Hawaiʻi, Planning Department. Kaʻū Community Development Plan, Draft for Public Review. March 2015.

County of Hawaiʻi, Planning Department. 2017 Kaʻū Community Development Plan, Ordinance 2017-66. October 2017.

County of Hawaiʻi, Planning Department. County of Hawaiʻi General Plan. Ordinance No. 05-025. February 2005.

County of Hawaiʻi, Department of Environmental Management. Final Environmental Assessment – Finding of No Significant Impact, the Nāʻālehu-Pāhala Large Capcaity Cesspool Conversion. August 2007.

County of Hawaiʻi, Department of Public Works. Final Environmental Assessment and – Finding of No Significant Impact, Kaʻū Gym and Shelter, Pāhala, Kaʻū District. April 2012.

Executive Order No. 12898, 59 FR 7629. 1994.

Executive Order No. 11988, 42 FR 26951, 3 CFR, p. 117, 1977, as amended by Executive Order Nos. 12148, 44 FR 43239, 3 CFR, p. 412, 1979 and 13690, 81 FR 57401, 44 CFR 9, p. 57401, 2016.

Executive Order No. 11990, 42 FR 26961, 3 CFR, p. 121, 1977, as amended by Executive Order No. 12608, 52 FR 2923, 1987.

Hawaiʻi County Code 1983 (2016 Edition, as amended). Chapter 21. Sewers

Hawaiʻi County Code 1983 (2016 Edition, as amended). Chapter 25. Zoning

State of Hawaiʻi. Department of Agriculture. 2012 Census of Agriculture – County Data 2012.

State of Hawaiʻi. Department of Health. Annual Summary 2015 Air Quality Data. December 2016.

State of Hawaiʻi. Title 11, Hawaiʻi Administrative Rules Department of Health Chapter 62 Wastewater Systems. March 21, 2016.

State of Hawaiʻi. Title 11 Hawaiʻi Administrative Rules Department of Health Chapter 23, Underground Injection Control. October 11, 2011.

State of Hawaiʻi. Title 11, Hawaiʻi Administrative Rules Department of Health Chapter 54, Water Quality Standards revised November 15, 2014.

U.S. Census Bureau, 2012-2016 American Community Survey. U.S. Census Bureau's American Community Survey Office, 2017. Web. 1 August 2018

U.S. Department of Agriculture Soil Conservation Service. Kaʻū River Basin Study, County of Hawaiʻi. February 1994.

16 U.S.C. § 469a-1. 1974.

16 U.S.C. § 668. 1940.

42 U.S.C. § 7506(c). 1970.

16 U.S.C. § 3501-3510. 2011.

16 U.S.C. § 1451-1464. 1972.

16 U.S.C. § 1531-1543. 1973.

7. U.S.C. § 4201-4209. 1981.

16 U.S.C. § 661-664. 1934.

16 U.S.C. § 1801 *et seq.* 1976.

16 U.S.C. § 1361 *et seq.* 1972.

16 U.S.C. § 703 *et seq.* 1918.

54 U.S.C. § 300101 *et seq.* 1966.

33 U.S.C. § 403. 1899.

42 U.S.C. § 300f-300j-9. 1974.

16 U.S.C. § 1271 *et seq.* 1968.

Appendix A
Responses to Pre-Assessment Consultation Letters

(10349-01) 4/12/18

Earl Matsukawa

From: Koskelo, Vera B CIV (US) <Vera.B.Koskelo@usace.army.mil>
Sent: Wednesday, April 11, 2018 11:24 AM
To: Earl Matsukawa
Subject: Corps comments on pre-assessment Consultation for DEA for POH-2018-00068 (Pahala Community Large Capacity Cesspool Replacement, Ka'u, Hilo, HI)

cc. BC

cc: AECOS 6/19/18

Aloha Mr. Matsukawa,

Thank you for the opportunity to comment on the preparation of a draft EA for the Pahala Community Large Capacity Cesspool Replacement.

The Corps has assigned the pre-application consultation for the project the following name and number: POH-2018-00068 (Pahala Community Large Capacity Cesspool Replacement, Ka'u, Hilo, HI). Please reference this project name and number in any subsequent communication with the Corps.

The Corps has determined that the information submitted with your letter dated March 15, 2018 is insufficient for the Corps to determine at this time whether a permit would be required for the proposed work. To receive a Corps permit determination (i.e. whether or not the project would require a Corps permit), please submit more detailed information about the proposed project including, but not limited to, the location of the proposed project within the public ROW using coordinates, TMKs, or similar boundary information; the boundaries of any proposed site access (roads) and utility lines that would be located on and/or off site to service the project; a description of any other work (e.g. staging, grading) proposed for location off-site; any project sketches and/or plans that illustrate the proposed project work; and the results of on-site investigations into the flora, soils, and observations about hydrology within the project site. If hydric soils and/or hydrophytic vegetation are found during on-site investigations on either of the parcels in the project site, consider conducting a wetland delineation.

Please feel free to contact me to discuss the project further.

The Regulatory Branch is committed to providing the highest level of customer service. I value your comments and appreciate you contacting me if you have any comments/concerns regarding our customer service.

Thank you,

Vera Koskelo
Biologist
Project Manager
Honolulu District
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawaii 96858-5440
808-835-4310
Vera.B.Koskelo@usace.army.mil

This message has been scanned for viruses and dangerous content using Worry-Free Mail Security and is believed to be clean.

WILSON OKAMOTO CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10349-01
June 22, 2018

Ms. Vera Koskelo, Biologist
U.S. Army Corps of Engineers, Honolulu District
Regulatory Branch
Building 230, Room 205
Fort Shafter, HI 96858

Vera.B.Koskelo@usace.army.mil

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment (POH-2018-0068)

Dear Ms. Koskelo:

Thank for your April 11, 2018 comment message regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will contain information regarding the project location, including the extent of the collection system within the right-of-way of County streets and the wastewater treatment and disposal site. As stated in the Project Summary, the proposed treatment and disposal system would occupy about 14 acres and consist of a headworks with screens to remove debris and an odor control unit, four lined aerated lagoons of about 0.3 acres each, an operations building with adjacent disinfection system to remove pathogens, an odor control unit, a subsurface flow constructed polishing wetland to remove nitrogen and two slow rate (SR) land treatment basins which will be surrounded by berms on all four sides. SR land treatment involves irrigation of plant material with the treated effluent. The Draft EA will provide descriptions and drawings related to these improvements. The County intends to locate the treatment and disposal site within an existing macadamia nut orchard that presently contains a surface mounted irrigation system.

As part of the Draft EA, a biological resources field survey will be conducted to identify flora and fauna present on the treatment and disposal site and any wetland conditions that may be present within the site.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

10349-01
4/24/18

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

CC: BC
RBG

In Reply Refer To:
01EPIF00-2018-TA-0275

April 23, 2018

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Subject: Comments for the Draft Environmental Assessment for the County of Hawaii Department of Environmental Management Pahala Community Large Capacity Cesspool Replacement, Paauau, Kau, Island and County of Hawaii

Dear Mr. Matsukawa:

The U.S. Fish and Wildlife Service (Service) received your correspondence on April 9, 2018, requesting technical assistance in the preparation for the Draft Environmental Assessment for the County of Hawaii Department of Environmental Management Pahala Community Large Capacity Cesspool (LCC) Replacement in Paauau, Kau, (TMK: 9-6-002: 018). The Service offers the following comments to assist you in your planning process so that impacts to trust resources can be avoided through site preparation, construction, and operation. Our comments are provided under the authorities of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C 1531 *et seq.*).

The County of Hawaii Department of Environmental Management (DEM) is proposing to construct wastewater system improvements to replace the current system servicing Pahala, now owned by the County. The wastewater system improvements would allow the County to comply with Environmental Protection Agency (EPA) regulations requiring closure of the LCC's and to construct a system meeting current State of Hawaii Department of Health and DEM design guidelines for the collection, treatment, and disposal of the treated effluent. The Pahala Community LCC closure project improvements would consists of a new wastewater collection system located within the public right-of-way and a treatment and disposal system located on a currently privately-owned parcel which would be acquired by the County. The Pahala LCC closure project would be funded by the EPA Special Appropriation Grant and by the State of Hawaii Clean Water State Revolving Fund loan program.

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Project, eight (8) listed species that have the potential to either be in or fly through the vicinity of the project area: The federally endangered Hawaiian hoary bat *(Lasiurus cinereus semotus)*, Hawaiian hawk *(Buteo solitarius)*, Nene

Branta (=Nesochen) sandvicensis)), Hawaiian petrel (*Pterodroma sandwichensis*), Band-rumped storm-petrel (*Oceanodroma castro*), the threatened Newell's shearwater (*Puffinus auricularis newelli*), Hawaiian stilt (*Himantopus mexicanus knudseni*), and the Hawaiian coot, (*Fulica alai*).

Avoidance and Minimization Measures

Hawaiian hoary bat
The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they forage. If trees or shrubs 15 feet or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground and can become entangled in barbed wire used for fencing.

To avoid and minimize impacts to the endangered Hawaiian hoary bat we recommend incorporating the following applicable measures into your project description:

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15).
- Do not use barbed wire for fencing.

Hawaiian hawk
The Hawaiian hawk is known to occur across a broad range of forest habitats throughout the Island of Hawaii. Loud, irregular and unpredictable activities, such as using heavy equipment or building a structure, near an endangered Hawaiian hawk nest may cause nest failure. Harassment of Hawaiian hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators.

To avoid and minimize impacts to Hawaiian hawks we recommend you consider incorporating the following applicable measures into your project description:

- If work must be conducted during the March 1 through September 30 Hawaiian hawk breeding season, have a biologist familiar with the species conduct a nest search of the project footprint and surrounding areas immediately prior to the start of construction activities.
    - Pre-disturbance surveys for Hawaiian hawks are only valid for 14 days. If disturbance for the specific location does not occur within 14 days of the survey, conduct another survey.
- No clearing of vegetation or construction activities within 1,600 feet of any active Hawaiian hawk nest during the breeding season until the young have fledged.
- Regardless of the time of year, no trimming or cutting trees containing a hawk nest, as nests may be re-used during consecutive breeding seasons.

Nene
Nene are found on the islands of Hawaii, Maui, Molokai, and Kauai predominately, with a small population on Oahu. They are observed in a variety of habitats, but prefer open areas, such as

pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. Threats to the species include introduced mammalian and avian predators, wind facilities, and vehicle strikes.

To avoid and minimize potential project impacts to Nene we recommend incorporating the following applicable measures into your project description:

- Do not approach, feed, or disturb Nene.
- If Nene are observed loafing or foraging within the project area during the Nene breeding season (September through April), have a biologist familiar with the nesting behavior of Nene survey for nests in and around the project area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of three or more days (during which the birds may attempt to nest).
    - Cease all work immediately and contact the Service for further guidance if a nest is discovered within a radius of 150 feet of proposed work, or a previously undiscovered nest is found within said radius after work begins.
- In areas where Nene are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.

Hawaiian petrel, Band-rumped storm-petrel, and Newell's shearwater
Hawaiian seabirds may traverse the project area at night during the breeding, nesting and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable.

To avoid and minimize potential project impacts to seabirds we recommend you incorporate the following applicable measures into your project description:

- Fully shield all outdoor lights so the bulb can only be seen from below bulb height and only use when necessary.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

Hawaiian stilt and Hawaiian coot
Listed Hawaiian waterbirds are found in fresh and brackish-water marshes and natural or man-made ponds. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur. Threats to these species include non-native predators, habitat loss, and habitat degradation.

Based on the project details provided, our information suggests that your project may result in standing water or the creation of open water, thus attracting Hawaiian waterbirds to the site. In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g. any ponding water),

if water is present. Hawaiian waterbirds attracted to sub-optimal habitat may suffer adverse impacts, such as predation and reduced reproductive success, and thus the project may create an attractive nuisance. Therefore, we recommend you work with our office during project planning so that we may assist you in developing measures to avoid impacts to listed species (e.g., fencing, vegetation control, predator management).

To avoid and minimize potential project impacts to Hawaiian waterbirds we recommend you incorporate the following applicable measures into your project description:

- In areas where waterbirds are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.
- If water resources are located within or adjacent to the project site, incorporate applicable best management practices regarding work in aquatic environments into the project design.
- Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the proposed project site prior to project initiation. Repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found:
    - Contact the Service within 48 hours for further guidance.
    - Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.

Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.

Invasive Species
To avoid and minimize the risk of the road construction introducing harmful invasive pests including coqui, ants, and weeds into the project sites, we recommend the following measures be implemented by project contractors:

- Vehicles, machinery, and equipment must be thoroughly pressure washed and visibly free of mud, dirt, plant debris, frogs and frog eggs, insects and other debris. A hot water wash is preferred. Areas of particular concern include bumpers, grills, hood compartments, areas under the battery, wheel wells, undercarriage, cabs, and truck beds.
- The interior and exterior of vehicles, machinery, and equipment must be free of rubbish and food. The interiors of vehicles and the cabs of machinery must be vacuumed clean. Floor mats will be sanitized with a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution.
- All work vehicles, machinery, and equipment may be subject to inspection.
- Any vehicles, machinery, and equipment that do not pass inspection will be turned away.
- Staging areas must be kept free of invasive pests.

Minimize Spread of Rapid Ohia Death
Rapid Ohia Death (ROD), a newly identified disease, has killed large numbers of mature ohia trees (*Metrosideros polymorpha*) in forests and residential areas of Hawaii Island. The disease is

caused by a vascular wilt fungus (*Ceratocystis fimbriata*). Crowns of an affected tree turn yellowish or brown within days to weeks and dead leaves typically remain on branches for some time. All ages of ohia trees can be affected and can have symptoms of browning of branches or leaves. As of early 2017 the disease has been confirmed in all districts except North and South Kohala. Additional information on ROD can be found at:

http://www2.ctahr.hawaii.edu/forestry/downloads/ROD-trifold-03.2016.pdf and
http://www2.ctahr.hawaii.edu/forestry/disease/ohia_wilt.html.

The following avoidance and minimization measures should be followed for projects working in ohia forests or at sites with ohia trees on Hawaii Island:

1) A survey of the proposed project site should be conducted within two weeks prior to any tree cutting to determine if there are any infected ohia trees. If infected ohia are suspected at the site, the following agencies should be contacted for further guidance.
   a. Service – please contact the name at the bottom of this letter.
   b. Dr. J.B. Friday, University of Hawaii Cooperative Extension Service, 808-969-8254 or jbfriday@hawaii.edu
   c. Dr. Flint Hughes, USDA Forest Service, 808-854-2617, fhughes@fs.fed.us
   d. Dr. Lisa Keith, USDA Agriculture Research Service, 808-959-4357, Lisa.Keith@ars.usda.gov

2) Both prior to cutting ohia and after the project is complete:
   a. Tools used for cutting infected ohia trees should be cleaned with a 70 percent rubbing alcohol solution. A freshly prepared 10 percent solution of chlorine bleach and water can be used as long as tools are oiled afterwards, as chlorine bleach will corrode metal tools. Chainsaw blades should be brushed clean, sprayed with cleaning solution, and run briefly to lubricate the chain.
   b. Vehicles used off-road in infected forest areas should be thoroughly cleaned. The tires and undercarriage of the vehicle should be cleaned with detergent if they have travelled from an area with ROD or travelled off-road. Use a pressure washer with soap to clean all soil off of the tires and vehicle undercarriage.
   c. Shoes and clothing used in infected forests should also be cleaned. Shoes should be decontaminated by dipping the soles in 70 percent rubbing alcohol to kill the ROD fungus. Other gear can be sprayed with the same cleaning solutions. Clothing can be washed in hot water and detergent.
   d. Wood of affected ohia trees should not be transported to other areas of Hawaii Island or interisland. All cut wood should be left on-site to avoid spreading the disease. The pathogen may remain viable for over a year in dead wood. The Hawaii Department of Agriculture has passed a quarantine rule that prohibits interisland movement, except by permit, of all ohia plant or plant parts.

If this project should receive federal funding, federal permit, or any federal authorization, it will require a Section 7 consultation with the Service. The Service only conducts Section 7 consultations with the federal action agency or their designated representative.

Thank you for participating with us in the protection of our endangered species. If you have any further questions or concerns regarding this consultation, please contact Eldridge Naboa, Fish and Wildlife Biologist, 808-284-0037, e-mail: eldridge_naboa@fws.gov. When referring to this project, please include this reference number: ***01EPIF00-2018-TA-0275.***

Sincerely,

JODI CHARRIER Digitally signed by JODI CHARRIER Date: 2018.04.23 08:04:41 -10'00'

Jodi Charrier
Acting Island Team Leader
Maui Nui and Hawaii Island

WILSON OKAMOTO CORPORATION

10349-01
August 20, 2018

Ms. Jodi Charrier, Acting Team Leader
Maui Nui and Hawaii Island
Fish and Wildlife Service
U.S. Department of the Interior
300 Ala Moana Boulevard
Room 3-122, Box 50088
Honolulu, HI 96850

Attention: Eldridge Naboa, Fish and Wildlife Biologist

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'ū Ka'u, Hawai'i
Response to Comment (01EPIF00-2018-TA-0275)

Dear Ms. Charrier:

Thank you for your April 23, 2018 comment letter (01EPIF00-2018-TA-0275) and the April 10, 2018 e-mail message from Eldridge Naboa regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. As stated in the Project Summary, the Pāhala Community Large Capacity Cesspool Replacement project would be funded by an Environmental Protection Agency (EPA) Special Appropriation Grant and by the State of Hawai'i Clean Water State Revolving Fund (CSRF) loan program. As such, we understand consultation will need to be conducted by a federal agency or by a designated non-federal representative.

On June 7, 2018, EPA Region 9 Water Division, designated Eastern Research Group, Inc. (ERG) as the non-federal representative for undertaking the consultation for this project.

As part of the Draft EA, in August 2018, botanical and biological field studies were undertaken along the streets and adjacent areas of wastewater collection system and at the 14.9-acre wastewater treatment and disposal facility project site. The results of the field surveys showed the collection system will be installed along already paved roadways within Pāhala. They also revealed that vegetation is located entirely within yards and consist of ornamental plants.

The field survey showed 52 species of vascular plants: 2 ferns, one gymnosperm, and 49 species of angiosperms (flowering plants). Only two species (4%) are regarded as native to the Hawaiian Islands and both are indigenous (native, but also distributed elsewhere in the Pacific). Being widely distributed indigenous species, neither is listed as threatened or endangered or of any special concern.

The avian survey recorded a total of 175 individual birds of 13 species, representing nine separate families during station counts. Avian diversity and densities were very low, in keeping with the current usage of the site as a mature macadamia nut orchard, with minimal ground cover and few weedy or shrubby species. All of the species recorded during the course of the survey are established alien species. No native avian species were recorded during the course of this survey.

The field survey report indicated that, although not detected during the survey, the endemic Hawaiian Petrel (*Pterodroma sandwichensis*) and Newell's Shearwater (*Puffinus newelli*) have been recorded over-flying the general area between April and the end of November each year. The petrel is listed as endangered, and the shearwater as threatened under both federal and State of Hawai'i endangered species statutes.

No species of plants or animals currently proposed for listing or listed under either the federal or State of Hawai'i endangered species statutes were recorded by the survey.

The Draft EA, will include a discussion of the avoidance and minimization measures as set forth in your April 23, 2108 letter.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director – Planning

cc: D. Beck, DEM
K. Rao, EPA
B. Rosen, ERG
C. Lekven, PE, BC

DAVID Y. IGE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
SAFE DRINKING WATER BRANCH
2385 WAIMANO HOME ROAD
ULUAKUPU BUILDING 4
PEARL CITY, HAWAII 96782-1400

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

10349-01
4/10/18
cc: BC

April 3, 2018

EM

RECEIVED
APR 05 2018
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA), PRE-ASSESSMENT CONSULTATION FOR PAHALA COMMUNITY LARGE CAPACITY CESSPOOL REPLACEMENT PAAUAU, KAU, HAWAII

The Safe Drinking Water Branch (SDWB) has reviewed your March 15, 2018 request for comments as part of the Draft EA pre-assessment consultation for the subject project.

The project is located above the Underground Injection Control (UIC) line. Areas above the UIC line are considered to be on top of underground sources of drinking water. Sewage injection wells are not allowed to be constructed above the UIC line. There is an existing drinking water well located approximately one (1) mile mauka of the proposed wastewater disposal and treatment site. In consideration of the project's location and situation, wastewater disposal by land application appears to be a very sensible proposal.

If you have any questions regarding this response, please contact Mr. Norris Uehara, Supervisor of the Safe Drinking Water Branch UIC program at 586-4258.

Sincerely,

JOANNA L. SETO, P.E., CHIEF
Safe Drinking Water Branch

NU:cb

WILSON OKAMOTO CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10349-01
June 21, 2018

Ms. Jonna Seto, Branch Chief
State of Hawai'i
Department of Health
Safe Drinking Water Branch
2385 Waimano Home Road
Pearl City, HI 96782

Attention: Norris Uehara

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Ms. Seto:

Thank for your April 3, 2018 comment letter (SDWS Pāhala LLC Replacement) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project.

The Draft Environmental Assessment (EA) will describe the project as located above the Underground Injection Control (UIC) line and, as such, will overlie underground sources of drinking water. Further, an existing drinking water well is located about 1 mile mauka of the treatment and disposal site. Lastly, the Draft EA will include that the project's disposal by slow land application is a very sensible proposal.

Thank you for your participation in the Draft EA process.

Sincerely,

FM
Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

DAVID Y. IGE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
File:
EPO 18-082

EM ✓
JS ✓
(10349-01)
4/11/18
cc: BC

April 3, 2018

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
APR 09 2018
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

SUBJECT: Pre-Assessment Consultation Draft Environmental Assessment (PAC DEA) for Pahala Community Large Capacity Cesspool Replacement, Kau, Hawaii
TMK: 9-6-002:018

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your PAC DEA to our office on March 20, 2018.

We understand from the project summary that *"the Pahala Community Large Capacity Cesspool Closure project improvements would consist of a new wastewater collection system located within the public right-of-way and a treatment and disposal system located on a currently privately-owned parcel (TMK: 9-6-002: 018) which will be acquired by the County."*

Hawaii's environmental review laws require Environmental Assessments (EAs) and Environmental Impact Statements (EISs) to consider health in the discussion and the mitigation measures to reduce negative impacts. In its definition of 'impacts,' §11-200-2, Hawaii Administrative Rules (HAR) includes health effects, whether primary (direct), secondary (indirect), or cumulative. Further, §11-200-12(b)(5), HAR, lists public health as one of the criteria for determining whether an action may have a significant impact on the environment.

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments to support sustainable healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

We suggest you review the requirements of the Clean Water Branch (Hawaii Administrative Rules (HAR), Chapter 11-54-1.1, -3, 4-8) and/or the National Pollutant Discharge Elimination System (NPDES) permit (HAR, Chapter 11-55) at: http://health.hawaii.gov/cwb. If you have any questions, please contact the Clean Water Branch (CWB), Engineering Section at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov. If your project involves waters of the U.S., it is highly recommended that you contact the Army Corps of Engineers, Regulatory Branch at: (808) 835-4303.

Please note that all wastewater plans must conform to applicable provisions (HAR, Chapter 11-62, "Wastewater Systems"). We reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should

you have any questions, please review online guidance at: http://health.hawaii.gov/wastewater and contact the Planning and Design Section of the Wastewater Branch (WWB) at (808) 586-4294.

If temporary fugitive dust emissions could be emitted when the project site is prepared for construction and/or when construction activities occur, we recommend you review the need and/or requirements for a Clean Air Branch (CAB) permit (HAR, Chapter 11-60.1 "Air Pollution Control"). Effective air pollution control measures need to be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures could include, but are not limited to, the use of water wagons, sprinkler systems, and dust fences. For questions contact the Clean Air Branch via e-mail at: Cab.General@doh.hawaii.gov or call (808) 586-4200.

Any waste generated by the project (that is not a hazardous waste as defined in state hazardous waste laws and regulations), needs to be disposed of at a solid waste management facility that complies with the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The open burning of any of these wastes, on or off site, is strictly prohibited. You may wish you review the Minimizing Construction & Demolition Waste Management Guide at: http://health.hawaii.gov/shwb/files/2016/05/constdem16.pdf Additional information is accessible at: http://health.hawaii.gov/shwb. For specific questions call (808) 586-4226.

If noise created during the construction phase of the project may exceed the maximum allowable levels (HAR, Chapter 11-46, "Community Noise Control") then a noise permit may be required and needs to be obtained before the commencement of work. Relevant information is online at: http://health.hawaii.gov/irhb/noise EPO recommends you contact the Indoor and Radiological Health Branch (IRHB) at (808) 586-4700 with any specific questions.

To better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed an environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We hope this information is helpful. If you have any questions please contact us at DOH.epo@doh.hawaii.gov or call us at (808) 586-4337. Thank you for the opportunity to comment.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office

LM:nn

c: DOH: DHO HI, WWB (via email only)

Attachment: U.S. EPA EJSCREEN Report for Project Area

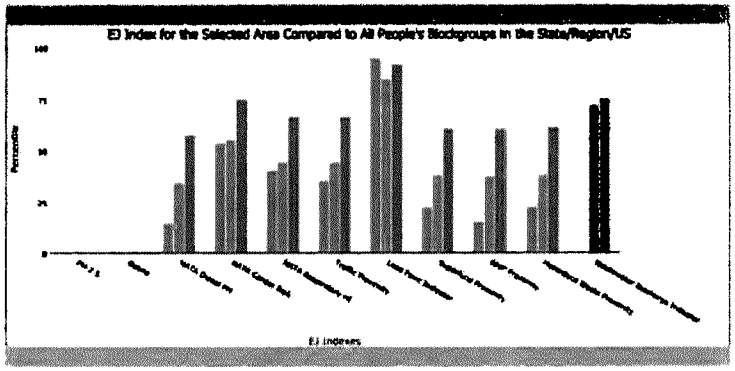
EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.189149,-155.479492, HAWAII, EPA Region 9

Approximate Population: 707

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	15	35	58
EJ Index for NATA* Air Toxics Cancer Risk	54	58	75
EJ Index for NATA* Respiratory Hazard Index	41	45	67
EJ Index for Traffic Proximity and Volume	36	46	67
EJ Index for Lead Paint Indicator	95	95	92
EJ Index for Superfund Proximity	23	39	61
EJ Index for RMP Proximity	16	36	61
EJ Index for Hazardous Waste Proximity	27	39	62
EJ Index for Wastewater Discharge Indicator	N/A	73	70



State Percentile Regional Percentile USA Percentile

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.189149,-155.479492, HAWAII, EPA Region 9

Approximate Population: 707

Input Area (sq. miles): 3.14

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.189149,-155.479482, HAWAII, EPA Region 9

Approximate Population: 707

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.9	N/A	9.14	N/A
Ozone (ppb)	N/A	N/A	N/A	41.8	N/A	38.4	N/A
NATA* Diesel PM (µg/m³)	0.00371	0.149	0	0.978	<50th	0.938	<50th
NATA* Cancer Risk (lifetime risk per million)	24	34	0	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.47	1	0	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	13	1000	22	1100	14	590	20
Lead Paint Indicator (% Pre-1960 Housing)	0.56	0.16	95	0.24	81	0.29	79
Superfund Proximity (site count/km distance)	0.0028	0.1	4	0.15	0	0.13	0
RMP Proximity (facility count/km distance)	0.015	0.39	0	0.98	0	0.73	0
Hazardous Waste Proximity (facility count/km distance)	0.0029	0.1	4	0.12	0	0.083	0
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.04	N/A	13	59	36	40
Demographic Indicators							
Demographic Index	66%	51%	89	47%	76	35%	88
Minority Population	88%	77%	64	59%	79	38%	89
Low Income Population	44%	26%	87	36%	85	34%	69
Linguistically Isolated Population	6%	8%	67	9%	52	5%	75
Population With Less Than High School Education	14%	9%	79	17%	52	13%	63
Population Under 5 years of age	8%	6%	70	7%	64	6%	67
Population over 64 years of age	19%	16%	70	13%	62	14%	78

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at http://www.epa.gov/national-air-toxics-assessment

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening level information. So it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 21, 2018

Ms. Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office
State of Hawaii Department of Health
P.O. Box 3378
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Ms. McIntyre:

Thank you for your April 3, 2018 comment letter (EPO 18-082) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will be prepared to in accordance with the requirements of Chapter 343, HRS, as amended, and Hawai'i Administrative Rules (HAR) Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules, including an assessment according to HAR §11-200-12(b)(5).

The Draft EA will include a discussion of surface waters and erosion control measures related to construction storm water runoff, as may be required for a National Pollutant Discharge Elimination System (NPDES) permit. Also, the Draft EA will include a discussion of surface water sources in the area and potential discharge to waters of the U.S.

As part of the project description, the Draft EA will note the wastewater treatment plant must conform to applicable provisions (HAR, Chapter 11-62, "Wastewater Systems").

With respect to air quality, the Draft EA will discuss fugitive dust emissions and potential measures to mitigate emissions during construction activities and from the emergency generator in relation to the requirements of HAR, Chapter 11-60.1 "Air Pollution Control." Hazardous waste will be discussed in relation to construction activities and the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The Draft EA will state the open burning of any of these wastes, on or off site, is strictly prohibited.

An analysis of noise created during the construction will also be included in the Draft EA.
As noted in the Project Summary, the Pāhala Community Large Capacity Cesspool Replacement project would be funded by an EPA Special Appropriation Grant and by the State of Hawai'i Clean Water State Revolving Fund (SRF) loan program. As such, the Draft EA will include an environmental justice (EJ) discussion on the Pāhala community.

We appreciate your participation in the Draft EA process.

Sincerely,

For Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
APR 09 2018
WILSON OKAMOTO CORPORATION

10341 01
4/4/18 JS
EWJ
CC: BL

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to
EMD/CWB

04007CEC.18

April 4, 2018

Mr. Earl Matsukawa
Project Manager
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: Pre-Assessment Consultation Comments on Pahala Community Large Capacity Cesspool Replacement Paauau, Kau, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter dated March 15, 2018, requesting comments on subject County of Hawaii (COH), Department of Environmental Management (DEM) proposed project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. The City and County of Honolulu, Department of Environmental Services (Applicant) may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf.

A. General Comments

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. The COH-DEM may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If COH-DEM project involves work in, over, or under waters of the United States, it is highly recommended that they contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations (CFR), Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

4. Please note that all discharges related to the project construction and/or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards (WQS). Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source

of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

Alec Wong

ALEC WONG, P.E., CHIEF
Clean Water Branch

EC:ak

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 21, 2018

Mr. Alec Wong, P.E., Chief, Clean Water Branch
State of Hawai'i
Department of Health
Clean Water Branch
P.O. Box 3378
Honolulu, HI 96801

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Wong:

Thank you for your April 4, 2018 comment letter (04007CEC.18) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will be prepared to in accordance with the requirements of Chapter 343, HRS, as amended, and Hawai'i Administrative Rules (HAR) Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules, including an assessment according to HAR §11-200-12(b)(5).

General Comments:

1. Based on the above, the Draft EA will include analysis of potential impacts to State waters including analysis measures necessary to protect the existing uses of the receiving State waters.

2. The Draft EA will include a discussion of surface waters and erosion control measures related to construction storm water runoff, as may be required for a National Pollutant Discharge Elimination System (NPDES) permit.

3. Also, the Draft EA will include a discussion of surface water sources in the area and potential discharges to waters of the U.S which might require approval by the Corps of Engineers and any associated need for a Section 401 Water Quality Certification (WQC).

4. The Draft EA will note that all discharges related to the project construction and/or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards (WQS).

5. The Draft EA will include a discussion of possible uses of storm water runoff from the project site and related facilities, consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation, and various green building practices.

We appreciate your participation in the Draft EA process.

Sincerely,

for Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

10349-01
4/16/18
cc: BC

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply please refer to
File:

LUD - 3 9 6 002 018
DEA Pahala Community-ID3968

April 10, 2018

EM ✓

RECEIVED
APR 11 '18

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Draft Environmental Assessment, Pre-Assessment Consultation
Pahala Community Large Capacity Cesspool Replacement
Paauau, Kau, Hawaii TMK (3) 9-6-002: 018
Request for Comment

Thank you for allowing us the opportunity to provide comments for the subject project. The subject project will be funded by the Hawaii Clean Water State Revolving Fund (CWSRF) Program. In order to comply with the Hawaii CWSRF Program requirements, the environmental assessment must address all applicable Federal environmental "cross-cutting" authorities, which can be found in the Hawaii State Environmental Review Process document.

Please be informed that the proposed wastewater systems for the community may have to include design considerations to address any effects associated with the construction of and/or discharges from the wastewater systems to any public trust, Native Hawaiian resources or the exercise of traditional cultural practices. In addition, all wastewater plans must conform to applicable provisions of the Hawaii Administrative Rules, Chapter 11-62, "Wastewater Systems."

Should you have any questions, please call Mr. Mark Tomomitsu at 586-4294.

Sincerely,

SINA PRUDER, P.E., CHIEF
Wastewater Branch

LM/MST:lim

c: Mr. Jonathan Nagato, DOH-WWB, PD-SRF
Ms. Laura McIntyre, DOH-EPO, via email
Ms. Amy Cook, DOH-WWB's Hilo Staff, via email
Mr. Dane Hiromasa, DOH-WWB's Kona Staff, via email

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 22, 2018

Ms. Sina Pruder, Branch Chief
Wastewater Branch
State of Hawai'i
Department of Health
2827 Waimano Home Road
Pearl City, HI 96782

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Ms. Pruder:

Thank you for your April 10, 2018 comment letter (LUD-396002 18) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will confirm that the project will use funds from the Hawai'i Clean Water State Revolving Fund (CWSRF) project and will include the various "cross cutter" authorities required as part of the State Environmental Review Process (SERP).

An archaeological inventory of survey will be conducted for the project and will include consultation with various governmental agencies, Native Hawaiian Organizations and interested parties to identify the concerns related to the project.

Lastly, the Draft EA will state the design of the collection system and the wastewater treatment and disposal system meets the requirements of Hawai'i Administrative Rules, Chapter 11-62.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

RECEIVED
APR 09 2018
Wilson Okamoto Corporation

DTS201804051430RI

April 5, 2018

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Draft Environmental Assessment, Pre-Assessment Consultation; Pahala Community Large Capacity Cesspool Replacement, Paauau, Kau, Hawaii; TMK: (3) 9-6-002: 018

Thank you for the opportunity to provide comments on the pre-consultation request for the preparation of a Draft Environmental Assessment (Draft EA) on the Pahala Community cesspool replacement project. The pre-consultation review material was transmitted to our office via letter dated March 15, 2018.

It is our understanding that the County of Hawaii Department of Environmental Management (DEM) proposes the construction of a wastewater collection and treatment system to replace the current large capacity cesspools that currently serve the residents of Pahala. The new wastewater collection system would comply with U.S. Environmental Protection Agency (EPA) regulations. The new wastewater system would also meet State Department of Health guidelines for the collection, treatment, and disposal of treated effluent.

The site for the proposed wastewater treatment system is currently used to grow macadamia nut trees. The trees will be removed and the area cleared for the installation of the system. The wastewater system would consist of 11,000 linear feet of gravity flow piping on 14 acres of land. It will include headworks with screens to remove debris, an odor control unit, lined aerated lagoons, an operations building with a disinfection system to remove pathogens, a slow flow rate land treatment basin, and berms that will surround the system on all four sides.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. The Hawaii State Planning Act.
   Pursuant to Hawaii Administrative Rules (HAR) § 11-200-10(4) – general description of the action's technical, economic, social, and environmental characteristics, this

project must demonstrate that it is consistent with state environmental, social, and economic goals and policies. Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Planning Act, provides goals, objectives, policies, planning coordination and implementation, and priority guidelines for growth, development, and the allocation of resources throughout the state.

   The Draft EA should include a discussion on the project's ability to meet all parts of HRS Chapter 226. The analysis should examine consistency with these statutes or clarify where it is in conflict with them. If any of these statutes are not applicable to the project, the analysis should affirmatively state such determination, followed by discussion paragraphs.

2. Principles of Sustainability.

   The Draft EA should include an examination on this cesspool removal project and its compatibility with Statewide sustainability goals. HRS § 226-108 – the priority guidelines on sustainability is the mainstay of sustainability policies for the State of Hawaii. An analysis on the project's consistency with this statute should be included in the Hawaii State Planning Act examination as noted above.

   Clean water resources and the connection to a healthy environment are discussed within the Hawaii 2050 Sustainability Plan. As a reference, we recommend that DEM reviews the Hawaii 2050 Sustainability Plan. The closure of a cesspool and its replacement with a more environmentally friendly onsite wastewater collection and treatment system is consistent with the Hawaii 2050 Sustainability Plan's water quality goals.

3. Objectives and Policies of the Hawaii Coastal Zone Management (CZM) Program.
   The CZM area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" (HRS § 205A-1).

   The Draft EA should include an assessment as to how the proposed action conforms to each of the goals and objectives as listed in HRS § 205A-2. Compliance with HRS § 205A-2 is an important component for satisfying the requirements of HRS Chapter 343.

4. State Land Use Agriculture District Permitted Uses.
   The parcel in question is located within the State Land Use Agricultural District. Pursuant to HRS § 205-2(d), the proposed wastewater facility is not a permitted use.

Please consult with the County of Hawaii, Department of Planning on the need for a Special Permit for this project on approximately 14 acres.

5. Stormwater Runoff, Erosion, and Water Resources.
Pursuant to HAR § 11-200-10(6) – identification and summary of impacts and alternatives considered; to ensure that the surface water and nearshore marine resources near the coastal area of the Kau District remain protected, the negative effects of stormwater inundation from this cesspool closure and wastewater system construction action should be evaluated in the Draft EA.

Issues that may be examined include, but are not limited to, project site characteristics in relation to flood and erosion prone areas, potential vulnerability of surface water resources, soil absorption characteristics of the area, risk of effluent seepage, and examining the amount of permeable versus impervious surfaces in the area. Developing mitigation measures for the protection for surface water resources and the coastal ecosystem should take this into account, pursuant to HAR § 11-200-10(7).

To assist in the development of stormwater runoff strategies, OP has developed guidance documents on this subject. We recommend consulting these stormwater evaluative tools when developing mitigation approaches for polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place, while considering the management practices best suited for the topography of the area and the types of contaminants potentially affecting nearby water resources. The evaluative tools that should be used during the design process include:

- Hawaii Watershed Guidance provides direction on mitigation strategies for urban development activities that will safeguard watersheds and implement watershed plans http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed Guidance Final.pdf
- Stormwater Impact Assessments can be used to identify and analyze information on hydrology, sensitivity of coastal and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area. http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_storm water_impact_assessments_guidance.pdf
- Low Impact Development (LID), A Practitioners Guide covers a range of structural BMPs for stormwater control management, onsite infiltration techniques, and water reuse methods that minimize negative environmental

impacts. http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Joshua Hekekia of our office at (808) 587-2845.

Sincerely,

Leo R. Asuncion
Director

WILSON OKAMOTO
CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10349-01
June 21, 2018

Mr. Leo Asuncion, Director
State of Hawai'i
Department of Business, Economic Development and Tourism
Office of Planning
PO Box 2359
Honolulu, HI 96804

Attention: Joshua Hekekia

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Asuncion:

Thank you for your April 5, 2018 comment letter (DTS201804051430RI) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will be prepared to in accordance with the requirements of Chapter 343, HRS, as amended, and Hawaii Administrative Rules (HAR) Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules, including an assessment according to (HAR) § 11-200-10(4)

1. Hawai'i State Planning Act.
The Draft EA will include a discussion on the project's consistency with the Chapter 226, HRS, as amended.

2. Principles of Sustainability.
The Draft EA will include a discussion on the project's consistency with Statewide sustainability goals.

3. Objectives and Policies of the Hawai'i Coastal Zone Management (CZM) Program.
As stated above, the Draft EA will be prepared to in accordance with the requirements of Chapter 343, HRS, as amended, and Hawai'i Administrative Rules (HAR) Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules which includes an assessment as project's conformance to each of the goals and objectives as listed in Chapter 205A-2, HRS.

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

4. State Land Use Agriculture District Permitted Uses.
The Draft EA will note the approximately 14.9-acre treatment and disposal project site is within the State Land Use Agricultural District and the project will require approval of a Special Use Permit from the County of Hawai'i Windward Planning Commission.

5. Stormwater Runoff, Erosion, and Water Resources.
As stated above, the Draft EA will be prepared to in accordance with the requirements of Chapter 343, HRS, as amended, and Hawai'i Administrative Rules (HAR) Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules, which includes discussion of impacts to surface water sources, the effect of rain events on the project and the amount of impervious surfaces created by the project.

We appreciate your participation in the Draft EA process.

Sincerely,

For Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

DOUGLAS S. CHIN
LT. GOVERNOR
STATE OF HAWAII

10349-01
4/10/18

JORDE M. K. MASAGATANI
CHAIRMAN
HAWAIIAN HOMES COMMISSION

WILLIAM J. AILA, JR.
DEPUTY TO THE CHAIRMAN

cc: EL

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P. O. BOX 1879
HONOLULU, HAWAII 96805

EM

March 27, 2018

RECEIVED
MAR 29 2018
WILSON OKAMOTO CORPORATION

Attention: Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Draft Environmental Assessment, Pre-Assessment Consultation; Pahala Community Large Capacity Cesspool Replacement; Paauau, Kau, Hawaii
Request for Comment

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project.

However, we highly encourage all agencies to consult with Hawaiian Homestead community associations and other (N)native Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians.

Mahalo for the opportunity to provide comments. If you have any questions, please call Rae Ann Hyatt, at 620-9480 or contact via email at raeann.p.hyatt@hawaii.gov.

Sincerely,

M. Kaleo Manuel
Acting Planning Program Manager

WILSON OKAMOTO CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10349-01
June 21, 2018

Mr. M. Kaleo Manuel, Acting Planning Program Manager
State of Hawai'i
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, HI 96805

Attention: Rae Ann Hyatt

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Manuel:

Thank you for your March 27, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will note that due to the project's lack of proximity to Hawaiian Home Lands, the Department of Hawaiian Home Lands does not anticipate any impacts to its lands or beneficiaries from the project.

As noted in the Project Summary, the Pāhala Community Large Capacity Cesspool Replacement project would be funded by an EPA Special Appropriation Grant and by the State of Hawai'i Clean Water State Revolving Fund (SRF) loan program. As such, the Draft EA will include consultation with Hawaiian Homestead community associations and other Native Hawaiian organizations to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians.

We appreciate your participation in the Draft EA process.

Sincerely,

For Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

10345-01
4/18/18

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

cc PC

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 16, 2018

Wilson Okamoto Corporation
Attention: Mr. Earl Matsukawa, AICP
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

via email: woc@wilsonokamoto.com

Dear Mr. Matsukawa:

SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for the **Pahala Community Large Capacity Cesspool Replacement Project** located at Pa'au'au, Ka'u, Island of Hawaii; within the Public Right-of-Way and TMK: (3) 9-6-002:018

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at (808) 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 27, 2018

'18 MAR 27 AM 11:09 ENGINEERING

MEMORANDUM

~~TO:~~ FROM

DLNR Agencies:
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

~~FROM:~~ To Russell Y. Tsuji, Land Administrator
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for the **Pahala Community Large Capacity Cesspool Replacement Project**
LOCATION: Pa'au'au, Ka'u, Island of Hawaii; Within the Public Right-of-Way and TMK: (3) 9-6-002:018
APPLICANT: Wilson Okamoto Corporation on behalf of the County of Hawaii, Department of Environmental Management

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments by **April 12, 2018.**

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: [signature]

Print Name: Carty S. Chang, Chief Engineer

Date: 4/3/18

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Pre-Assessment Consultation for Draft Environmental Assessment for the Pahala Community Large Capacity Cesspool Replacement Project, Pa'au'au, Ka'u, Island of Hawaii; Within the Public Right-of-Way and TMK: (3) 9-6-002:018

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 4/3/18

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2018 APR 13 AM 6:36
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2018 MAR 29 P 12:08
RECEIVED
LAND DIVISION
HILO, HAWAII

March 27, 2018

MEMORANDUM

From:
TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

To:
FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for the **Pahala Community Large Capacity Cesspool Replacement Project**
LOCATION: Pa'au'au, Ka'u, Island of Hawaii; Within the Public Right-of-Way and TMK: (3) 9-6-002:018
APPLICANT: Wilson Okamoto Corporation on behalf of the County of Hawaii, Department of Environmental Management

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments by **April 12, 2018.**

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: _____

Print Name: GORDON C. HEIT

Date: 4/12/18

4/12/18
Fax To: Darlene Nakamura (1 pg)
From: HDLO

Attachments
cc: Central Files

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 22, 2018

Mr. Russell Y. Tsuji, Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
1151 Punchbowl Street
Honolulu, HI 96813

Attention: Ms. Darlene Nakamura

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Tsuji:

Thank you for your April 16, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will include that the Engineering Division stated the responsibility for conducting research as to the flood hazard designation for the project site lies with the project proponent. Further, the Land Division Hawaii District has no comment.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

10349-01
4/18/18
CC: BC

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

CC: RKG
4/24/18

Earl Matsukawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

April 18, 2018

Dear Earl Matsukawa,

The Department of Land and Natural Resource's Division of Forestry and Wildlife (DOFAW) has received your inquiry regarding the proposed Pāhala Community large capacity cesspool replacement located in Pā'au'au, Ka'u on the island of Hawai'i. The County of Hawaii Department of Environmental Management is proposing to construct wastewater system improvements to replace the current system servicing Pāhala. The new wastewater collection system would consist of 11,000 linear feet of gravity flow piping ranging from 8 to 12 inches in diameter. The proposed treatment and disposal system would occupy approximately 14 acres and consist of headworks with screens to remove debris and an odor control unit, four lined aerated lagoons of about 0.3 acres each, subsurface flow constructed polishing wetland and four land treatment basins. A security fence will be constructed along the perimeter of the site.

The State and Federally listed Hawaiian hoary bat or 'Ōpe'ape'a (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the proposed project. Hawaiian hoary bats roost in both exotic and native trees. DOFAW recommends avoiding the use of barbed wire, as bat mortalities have been documented as a result of becoming ensnared by barbed wire during flight. Bats are also known to be attracted to water features and ponding of water. If any trees are planned for removal during the bat breeding season there is a risk of injury or mortality to juvenile bats. To minimize the potential for impacts to this species, site clearing should be timed to avoid disturbance to breeding Hawaiian hoary bats; woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15)

The endangered Hawaiian hawk or 'io (*Buteo solitaries*) may occur in the project vicinity. DOFAW recommends surveying the area to ensure no Hawaiian hawk nests are present if trees are to be cut. DOFAW would like to ensure that effective avoidance measures are in place to prevent adverse impacts to native seabirds. Artificial lighting can causing disorientation which could result in collision with manmade artifacts or grounding of birds. If nighttime lighting is required DOFAW recommends that any lights used be fully shielded to minimize impacts.

Construction of aerated lagoons, polishing wetland and land treatment basins are likely to attract endangered waterbirds such as the Hawaiian duck (*Anas wyvilliana*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica alai*), Hawaiian goose, or Nēnē (*Branta sandvicensis*) and Hawaiian moorhen (*Gallinula chloropus sandvicensis*) to the proposed project site. DOFAW requests that the project proponent initiate consultation with our office to further assess the impact of the project on endangered and threatened species.

We appreciate your efforts to work with our office for the conservation of our native species. If you have any questions, please contact James Cogswell, Wildlife Program Manager at (808) 587-4187 or James.M.Cogswell@hawaii.gov.

Sincerely,

James M. Cogswell
Wildlife Program Manager

WILSON OKAMOTO CORPORATION

10349-01
August 20, 2018

Mr. James Cogswell, Wildlife Program Manager
Division of Forestry and Wildlife
State of Hawai'i
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Cogswell:

Thank you for your April 18, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. As part of the Draft Environmental Assessment (EA), in August 2018, botanical and avian field studies were undertaken along the streets and adjacent areas of the wastewater collection system and at the wastewater treatment and disposal facility project site.

The avian survey recorded a total of 175 individual birds of 13 species, representing nine separate families during station counts. Avian diversity and densities were very low, in keeping with the current usage of the site as a mature macadamia nut orchard, with minimal ground cover and few weedy or shrubby species. All of the species recorded during the course of the survey are established alien species. No native avian species were recorded during the course of this survey.

No species of plants or animals currently proposed for listing or listed under either the federal or State of Hawai'i endangered species statutes were recorded by the survey.

The potential that the treatment and disposal facility could attract a listed species will be discussed in the Draft EA, along with the avoidance and minimization measures as set forth in your April 18, 2108 letter.

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director - Planning

cc: D. Beck, DEM
K. Rao, EPA
B. Rosen, ERG
C. Lekven, PE, BC

DAVID Y. IGE
GOVERNOR

10349-01
4/13/18
cc: BC

JADE T. BUTAY
DIRECTOR

Deputy Directors
ROY CATALANI
ROSS M. HIGASHI
EDWIN H. SNIFFEN
DARRELL T. YOUNG

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
DIR 0327
STP 8.2379

April 10, 2018

EM

RECEIVED
APR 12 2018
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Pahala Community Large Capacity Cesspool Replacement
Draft Environmental Assessment, Pre-Assessment Consultation
Paauau, Kau, Hawaii
TMK: (3) 9-6-002:018

The Department of Transportation (DOT) understands, The County of Hawai'i is proposing to construct wastewater system improvements to replace the current system servicing Pahala. The Pahala Community Large Capacity Cesspool Closure project improvements would consist of a new wastewater collection system located within the public right-of-way under the County jurisdiction and a treatment and disposal system located on a currently privately-owned parcel (TMK: 9-6-002:018) which will be acquired by the County. While the project location map reflects the subject project being adjacent to Mamalahoa Highway, we understand the project will be approximately 60 feet from the highway right of way.

Based on the information provided, the subject project is not expected to significantly impact the State highway facility.

If there are any questions, please contact Mr. Blayne Nikaido of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7979.

Sincerely,

JADE T. BUTAY
Director of Transportation

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 22, 2018

Mr. Jade Butay, Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Attention. Blayne Nikaido

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Butay:

Thank you for your April 10, 2018 comment letter (DIR 0327 STP 8.2379) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will confirm the wastewater collection system and the treatment and disposal project site are located outside of the highway right of way.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

10349-01
4/24/18

EM

DAVID Y. IGE
GOVERNOR

RODERICK K. BECKER
Comptroller

AUDREY HIDANO
Deputy Comptroller

cc: BC

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1108.8

APR 20 2018

RECEIVED
APR 23 2018
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Draft Environmental Assessment, Pre-Assessment Consultation
Pahala Community Large Capacity Cesspool Replacement
Paauau, Kau, Hawaii

Thank you for the opportunity to provide comments on the subject project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, your staff may call Mr. David DePonte of the Public Works Division at 586-0492.

Sincerely,

RODERICK K. BECKER
Comptroller

c: Mr. John Chung, DOE Facilities
Mr. Cory Kaizuka, DAGS Hawaii

WILSON OKAMOTO
CORPORATION

10349-01
August 20, 2018

Mr. Roderick Becker, Comptroller
State of Hawai'i
Department of Accounting and General Services
1151 Punchbowl Street
Honolulu, HI 96813

Attention: David DePonte

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Becker:

Thank you for your April 20, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. We acknowledge that the project does not impact any Department of Accounting and General Services projects or existing facilities.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director - Planning

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

10349-01
4/16/18 cc: BC

Harry Kim
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

April 13, 2018

Earl Matsukawa, AICP
Wilson Okamoto Corporation
Project Manager
1907 S. Beretania Street, Suite 400
Honolulu, Hawai'i 96826

Dear Mr Earl Matsukawa:

SUBJECT: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement, Paauau, Ka'ū Hawai'i

We are in receipt of your letter dated March 15, 2018 in regards to a draft Environmental Assessment and Anticipated finding of no significant Impact for the above listed subject.

The Hawai'i Fire Department has no issues or comments with regards to the request for draft Environmental Assessment, Pre-Assessment Consolation.

If you should have any questions, please feel free to contact my office at (808)932-2911.

Mahalo,

DARREN J. ROSARIO
Fire Chief

RP/ds

Hawai'i County is an Equal Opportunity Provider and Employer.

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 22, 2018

Chief Darren Rosario, Fire Chief
County of Hawai'i
Hawai'i Fire Department
25 Aupuni Street, Suite 2501
Hilo, HI 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Chief Rosario:

Thank you for your April 13, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will note the Hawai'i Fire Department had no issues with the project.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

Harry Kim
Mayor

(10349-01)
4/10/18

Paul K. Ferreira
Police Chief

cc: BC Kenneth Bugado Jr.
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

EM

April 2, 2018

RECEIVED
APR 05 2018
WILSON OKAMOTO & CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT, PRE-ASSESSMENT CONSULTATION;
PĀHALA COMMUNITY LARGE CAPACITY CESSPOOL REPLACEMENT
PĀ'AU'AU, KA'U, HAWAI'I
REQUEST FOR COMMENT

Dear Mr. Matsukawa:

Staff has reviewed the draft regarding the Pahala Cesspool Replacement Project. The Hawai'i Police Department does not have any comments or concerns at this time.

Thank you for allowing the Hawai'i Police Department the opportunity to provide input into this assessment.

Should you require additional assistance or input, please contact Captain Kenneth Quiocho, Commander of the Ka'u District, at (808) 939-2520 or via email at kenneth.quiocho@hawaiicounty.gov.

Sincerely,

PAUL K. FERREIRA
POLICE CHIEF

KQ

WILSON OKAMOTO
CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10349-01
June 21, 2018

Chief K. Paul Ferreira, Police Chief
County of Hawai'i
Police Department
349 Kapiolani Street
Hilo, HI 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Chief Ferreira:

Thank you for your April 2, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will note the Hawai'i Police Department had no concerns at this time.

We appreciate your participation in the Draft EA process.

Sincerely,

for Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

Harry Kim
Mayor

Michael Yee
Director

Daryn Arai
Deputy Director

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

(10349-01)
4/30/18
cc: BC
EM: JS

April 25, 2018

RECEIVED

Mr. Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

SUBJECT: REVISED Draft Environmental Assessment, Pre-Assessment Consultation
Project: Pāhala Community Large Capacity Cesspool Replacement
TMK: (3) 9-6-002:018, Pā'au'au, Ka'ū, Hawai'i

Thank you for your letter dated March 15, 2018, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA) for the subject project. Please note, this letter replaces our previous response dated April 16, 2018.

The County of Hawai'i, Department of Environmental Management (DEM) is proposing to construct wastewater system improvements to replace the current County owned system servicing Pāhala. These wastewater system improvements would allow the County to comply with Environmental Protection Agency (EPA) regulations requiring closure of the large capacity Cesspools and to construct a system meeting current State of Hawai'i Department of Health (DOH) and DEM design guidelines for the collection, treatment, and disposal of the treated effluent. We would respectfully ask that you consider expanding the collection system to service the greater urban Pāhala area or design the treatment facilities capacity to ensure expansion is possible in the future.

The subject parcel consists of 42.5 acres and is zoned Agricultural (A-20a) by the County. It is located in the State Land Use Agricultural (A) district. In addition, the parcel is designated Low Density Urban (LDU) and Industrial (IND) by the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) Map. The subject parcel is not located within the Special Management Area (SMA).

According to Hawai'i County Code (Zoning), Section 25-5-72(c), Public uses and structures, other than those necessary for agricultural practices are permitted in the Agricultural district, provided that a special permit is obtained for such use if the building site is located within the State land use agricultural district. Therefore, the treatment and disposal facility, considered a public use, would require a special permit.

In addition, the Land Study Bureau (LSB) classifies the subject parcel as B and D soils. Agricultural Lands of Importance to the State of Hawai'i (ALISH) classifies the subject parcel as a mix of Type 0 (Unclassified), Type 1 (Prime Lands), and Type 3 (Other). Hawai'i Revised Statutes (HRS) 205-4.5 (a) states *"Within the agricultural district, all lands with soil classified by the land study bureau's detailed land classification as overall productivity rating class A or B and for solar energy facilities, class B or C, shall be restricted to the following permitted uses: (7) Public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings such as booster pumping stations, **but not including** offices or yards for equipment, material, vehicle storage, repair or maintenance, **treatment plants**, corporation yards, or other similar structures;"* Therefore, when considering the Special Permit application, it would be advisable to locate the treatment facility on the proposed property in the LSB D soil and ALISH Type 0 area.

The public utilities chapter of the County of Hawai'i General Plan 2005 (as amended), includes the following policy (11.6.2) pertinent to the proposed project:

c) *Immediate steps should be taken to designate treatment plant sites, sewerage pump station sites, and sewer easements according to facility plans to facilitate their acquisition.*

In the DEA, please describe how the proposed use is consistent with the policies, standards and courses of action of the County of Hawai'i General Plan.

The project site is located in the Ka'ū Community Development Plan (CDP) planning area and the DEA should include a discussion of the proposed project's alignment with the CDP, which can be found electronically at http://www.hawaiicountycdp.info/kau-cdp, including but not limited to:

- *Objective 2: Preserve prime and other viable agricultural lands and preserve and enhance viewscapes that exemplify Ka'ū's rural character.*
- *Objective 7: Identify viable sites for critical community infrastructure, including water, emergency services and educational facilities to serve both youth and adults.*

- *Policy 120: Extend the primary wastewater collection lines in Pāhala and Nā'ālehu so that infill development projects can connect wastewater systems built for new subdivisions to the County systems.*

We recommend the DEA also describe the proposed project's consistency with Hawai'i Revised Statutes (HRS), Chapter 205A, Coastal Zone Management. More specifically, the DEA should describe the projects consistency with Policy (3)(B) to "*Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline.*"

Finally, given Ka'ū's rich heritage of natural and cultural resources, appropriate attention should be given to identifying any existing resources on the subject property or surrounding areas that may be impacted.

We have no further comments to offer at this time. However, please keep us informed and provide our department with a copy of the DEA for our review and comment.

Should you have any questions, please feel free to contact Keiko Mercado of this office at Keiko.Mercado@hawaiicounty.gov or (808) 961 8134.

Sincerely,

MICHAEL YEE
Planning Director

KM:bm:ja
\\COH33\planning\public\wpwin60\Keiko\EA-EIS Review\PreconsultationEA-Pahala.Large.Cesspool.Replacement.REVISED.doc

WILSON OKAMOTO
CORPORATION

10349-01
August 20, 2018

Mr. Michael Yee, Director
County of Hawai'i
Planning Department
Aupuni Center, 101 Pauahi Street, Suite 3
Hilo, HI 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Yee:

Thank you for your April 25, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. As stated in the Project Summary, the Pāhala Community Large Capacity Cesspool Replacement project would be funded by an Environmental Protection Agency (EPA) Special Appropriation Grant and by the State of Hawai'i Clean Water State Revolving Fund (CSRF) loan program administered by the Department of Health (DOH) Wastewater Branch. Both the EPA and DOH require preparation of an Environmental Assessment (EA) according to their respective guidelines.

The Draft Environmental Assessment (EA) will confirm that the treatment and disposal project site is zoned Agricultural (A-20a) by the County. It is located in the State Land Use Agricultural (A) district. In addition, the parcel is designated Low Density Urban (LOU) and Industrial (IND) by the Hawai 'i County General Plan Land Use Pattern Allocation Guide (LUPAG) Map. The project site parcel is not located within the Special Management Area (SMA).

According to Hawai'i County Code (Zoning), Section 25-5-72(c), Public uses and structures, other than those necessary for agricultural practices are permitted in the Agricultural district, provided that Special Permit is obtained for such use or building located within the State land use agricultural district. The treatment and disposal facility is considered a public use in the State Land Use Agricultural district and, therefore, would require a Special Permit.

The Draft EA will note the Land Study Bureau (LSB) classifies the subject parcel as B and D soils. Agricultural Lands of Importance to the State of Hawai'i (ALISH) classifies the subject parcel as a mix of Type 0 (Unclassified), Type 1 (Prime Lands), and Type 3 (Other).

Hawai'i Revised Statutes (HRS) 205-4.5 (a) states *"Within the agricultural district, all lands with soil classified by the Land Study Bureau's detailed land classification as overall productivity rating class A or B and/or solar energy facilities, class B or C, shall be restricted to the following permitted uses: Public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings such as booster pumping stations, but not including offices or yards for equipment, material, vehicle storage, repair or maintenance, treatment plants, corporation yards, or other similar structures;"* Therefore, when considering the Special Permit application, it would be advisable to locate the treatment facility on the proposed property in the LSB D soil and ALISH Type 0 area.

The Draft EA will note HRS §205.46(b) states: *"Uses not expressly permitted in subsection (a) shall be prohibited, except the uses permitted as provided in §205-6 (a) which states: subject to this section, the County Planning Commission may permit certain unusual and reasonable uses within agricultural and rural districts other than those for which the district is classified. Any person who desires to use the person's land within an agricultural or rural district other than for an agricultural or rural use, as the case may be, may petition the Planning Commission of the county within which the person's land is located for permission to use the person's land in the manner desired."* Accordingly, the Department of Environmental Management will submit a Special Permit application to the County Planning Commission for the Pāhala Community Large Capacity Cesspool Replacement project.

The Draft EA will be prepared to meet the DOH requirements which would include a discussion of plans and policies applicable to the project site and surrounding area. The discussion would cover the policies, standards and courses of action set forth in the County of Hawai'i General Plan.

The Draft EA will also discuss the Ka'u Community Development Plan (CDP) dated October 2017 Ordinance No. 2017-66. The various objectives and policies set forth in the plan, including those related to the wastewater collection system servicing areas not presently serviced by the LCC. The Draft EA will also discuss County of Hawai'i Code Chapter 21 related Article 2 Section 21-5 which states: ("(a) Owners of all dwellings, buildings, or properties used for human occupancy, employment, recreation, or other purposes, which are accessible to a sewer are required at their expense to connect directly with the public sewer within 180 days after date of official notice.") The Draft EA will also include a discussion the treatment and disposal system to service the entire Pāhala community.

As previously stated, the Draft EA will be prepared to meet the DOH requirements which would include a discussion of plans and policies applicable to the project site and surrounding area including Chapter 205A, Hawai'i Revised Statutes, Coastal Zone Management.

The Draft EA will discuss archaeological and cultural resources and consultation with the State of Hawai'i Department of Land and Natural Resources State Historic Preservation Division and various Native Hawai'ian Organizations as required by 54 U.S.C. §300101 and 54 §306108.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Vice President, Director - Planning

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

(10349-01) 4/17/18

Harry Kim
Mayor

Wil Okabe
Managing Director

Allan G. Simeon, P.E.
Director

cc: BC

Merrick H. Nishimoto
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiicounty.gov

APRIL 16, 2018

WILSON OKAMOTO CORPOARTION
1907 SOUTH BERETANIA STREET, SUITE 400
HONOLULU, HAWAII 96826
ATTN: EARL MATSUKAWA, AICP

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT, PRE-ASSESSMENT CONSULATION; PAHALA COMMUNITY LARGE CAPACITY CESSPOOL REPLACEMENT
PA'AU'AU, KA'U, HAWAI'I
TMK: (3) 9-6-002:018 & Associated Streets

We received the subject dated March 15, 2018 and have the following comments:

The subject parcel is in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA). Zone X is an area determined to be outside the
500-year floodplain.

All activities shall comply with the requirements of Hawaii County Code (HCC), Chapter 10, Erosion and Sedimentary Control.

Construction within the County right-of-way shall comply with HCC, Chapter 22, County Streets.

Should there be any questions concerning this matter, please contact Ms. Robyn Matsumoto in our Engineering Division at (808) 961-8924.

BEN ISHII, Division Chief
Engineering Division

RM

County of Hawai'i is an Equal Opportunity Provider and Employer.

WILSON OKAMOTO
CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 22, 2018

Mr. Ben Ishii, Division Chief
Engineering Divison
County of Hawai'i
Department of Public Works
Aupuni Center, 101 Pauahi Street, Suite 7
Hilo, HI 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Ishii:

Thank you for your April 10, 2018 comment letter (LUD-396002 18) regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will show the collection system and wastewater treatment and disposal project will be located within the Zone X, area determined to be outside the 500-year floodplain, as designated by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM).

The Draft EA will indicate that the design plans will need to conform to Hawaii County Code, Chapter 10, Erosion and Sedimentary Control and Chapter 22, Streets.

We appreciate your participation in the Draft EA process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

(10349-01) EM ✓
4/11/18 JS ✓
cc: BL

DEPARTMENT OF WATER SUPPLY · COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 · HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 · FAX (808) 961-8657

April 5, 2018

RECEIVED
APR 09 2018
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

Subject: Pre-Environmental Assessment Consultation
Pāhala Villages Large Capacity Cesspool Conversion Replacement
Pāhala, Ka'ū, Island of Hawai'i, Hawai'i
Tax Map Key (3) 9-6-002:018

This is in response to your Pre-Environmental Assessment letter dated March 15, 2018.

Please be informed that the subject parcel does not have an existing water service with the Department as the parcel is beyond the service limits of the Department's existing water system. The nearest point of connection is from an existing 6-inch waterline at the intersection of Huapala Street and Maile Street, approximately 2,000 feet northeast of the property.

The Department would request estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, for review. After review of the calculations, the Department will determine if water is available and a water commitment can be issued, the water commitment deposit amount, facilities charges due, and water system improvements and other conditions for final approval.

The Department requests that the construction plans show, and the proposed sewer lines be installed with, the proper horizontal and vertical clearances from our existing water system facilities and concrete jacketing at waterline crossings, where necessary, as recommended by the Department's Water System Standards.

In addition, backflow prevention devices must be installed where there are connections to our water system at wastewater processing and treatment facilities.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

Keith K. Okamoto, P.E.
Manager-Chief Engineer

RQ:dmj

copy - County of Hawai'i, Department of Environmental Management, Wastewater Division

. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .

The Department of Water Supply is an Equal Opportunity provider and employer.

WILSON OKAMOTO CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10349-01
June 21, 2018

Mr. Keith Okamoto, Manager-Chief Engineer
County of Hawai'i
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, HI 96720

Attention: Ryan Quitoriano, Water Resources Planning Branch

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Pāhala Community Large Capacity Cesspool Replacement
Pā'au'au, Ka'u, Hawai'i
Response to Comment

Dear Mr. Okamoto:

Thank you for your April 5, 2018 comment letter regarding the County of Hawai'i Department of Environmental Management Pāhala Community Large Capacity Cesspool Replacement project. The Draft Environmental Assessment (EA) will note the treatment and disposal project site parcel does not have an existing water service from the Department as the parcel is beyond the service limits of the Department's existing water system. The nearest point of connection is from an existing 6-inch waterline at the intersection of Huapala Street and Maile Street, approximately 2,000 feet northeast of the property.

The Draft EA will note that the project will require estimated maximum daily water usage calculations be prepared by a professional engineer, licensed in the State of Hawai'i. After review of the calculations, the Department will determine if water is available and a water commitment can be issued, the water commitment deposit amount, facilities charges due, and water system improvements and other conditions for final approval.

The construction plans will show proposed collection system lines and the horizontal and vertical clearances from water system lines.

We appreciate your participation in the Draft EA process.

Sincerely,

for Earl Matsukawa, AICP
Project Manager

cc: D. Beck, DEM
K. Rao, EPA
C. Lekven, PE, BC

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B

June 2018 Preliminary Engineering Report (PER)

Pahala Wastewater Treatment Plant Preliminary Engineering Report

Prepared for

County of Hawaii, Department of Environmental Management

June 2018

Pahala Wastewater Treatment Plant
Preliminary Engineering Report

Prepared for

County of Hawaii, Department of Environmental Management

June 2018

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Signature	April 30, 2020 Expiration Date of the License

Brown AND Caldwell

1955 Main Street, Suite 200
Wailuku, Hawaii 96793

This page intentionally left blank.

Table of Contents

List of Figures vi

List of Tables vii

List of Abbreviations ix

1. Introduction 1-1
   - 1.1 Background 1-1
   - 1.2 Existing System 1-1
   - 1.3 Report Contents 1-1
2. Flow and Load Projections 2-1
   - 2.1 Service Area 2-1
   - 2.2 Flow Projections 2-3
   - 2.3 Influent Characteristics 2-3
   - 2.4 Influent Mass Loads 2-3
   - 2.5 Mass Loads to the Environment via Existing LCCs 2-4
3. Effluent Management Options and Regulatory Requirements 3-1
   - 3.1 Effluent Management Options 3-1
     - 3.1.1 Ocean Discharge 3-1
     - 3.1.2 Subsurface Disposal via Injection Wells 3-1
     - 3.1.3 Water Recycling 3-1
     - 3.1.4 Land Treatment 3-2
     - 3.1.5 Drain Field 3-3
     - 3.1.6 Recommendation 3-3
   - 3.2 Treatment Requirements 3-3
4. Wastewater Treatment Evaluations 4-1
   - 4.1 Preliminary Treatment 4-1
     - 4.1.1 Screening 4-1
     - 4.1.2 Influent Flow Measurement 4-2
     - 4.1.3 Influent Flow Sampling 4-2
     - 4.1.4 Preliminary Design of Headworks 4-2
     - 4.1.5 Odor Control 4-4
   - 4.2 Aerated Lagoon Treatment System 4-5
     - 4.2.1 Aerated Lagoon Kinetics 4-5
     - 4.2.2 Aeration in Lagoon Systems 4-5
     - 4.2.3 Aerated Lagoon Configuration 4-7
     - 4.2.4 Lagoon Liner 4-8
     - 4.2.5 Lagoon Cover 4-9
     - 4.2.6 Lagoon Sludge Management 4-11

4.3 Subsurface Flow Constructed Wetland 4-11
4.3.1 Denitrification in Subsurface Flow Constructed Wetlands 4-11
4.4 Disinfection 4-12
4.4.1 Calcium Hypochlorite 4-12
4.4.2 Ultraviolet Light (UV) Disinfection 4-16
4.4.3 UV System Design Summary 4-16
4.4.4 Cost Evaluation 4-17
4.4.5 Disinfection Recommendation 4-17
4.5 Effluent Management 4-17
4.5.1 Design 4-18
4.6 Ancillary Systems 4-20
4.6.1 Water 4-20
4.6.2 Access Road 4-20
4.6.3 Stormwater Management 4-21
4.6.4 Pre-development Stormwater Conditions 4-21
4.6.5 Electrical Systems 4-25
4.6.6 Telemetry Systems 4-26
4.6.7 Operations Building 4-26
4.6.8 Site Fencing 4-26
5. Preliminary Design of Improvements 5-1
5.1 Site Plan 5-1
5.2 Process Schematic 5-1
5.3 Design Criteria 5-4
5.4 Environmental Benefits 5-6
5.5 Cost Estimates 5-8
5.6 Future Expansion 5-8
5.6.1 Full Buildout Flows 5-8
5.6.2 Improvements 5-8
6. Implementation 6-1
7. Alternative Treatment Options Evaluation 7-1
7.1 Option Descriptions 7-1
7.1.1 Option 1: Aerated Lagoons/Constructed Wetland/Land Application 7-1
7.1.2 Option 2: R-1 Treatment/Land Application 7-1
7.1.3 Option 3: R-1 Treatment/Seasonal Water Recycling 7-2
7.1.4 Option 4: R-1 Treatment and Storage for 100% Water Recycling 7-4
7.1.5 Option 5: Maximum Practical Treatment 7-6
7.2 Cost Comparisons 7-7
7.2.1 Capital Costs 7-7
7.2.2 Operation and Maintenance Costs 7-7
7.2.3 Recycled Water Sale Proceeds 7-8

7.2.4 Life-Cycle Costs 7-8
7.3 Non-Economic Discussion 7-9
7.3.1 Labor Requirements 7-10
7.3.2 Operational Complexity 7-10
7.3.3 Energy Consumption 7-11
7.3.4 Sludge Management 7-11
7.4 Living Machine® 7-11
7.5 Septic Tank Alternatives 7-12
7.5.1 Community Septic Tank 7-12
7.5.2 Converting LCC to Seepage Pit 7-12
7.5.3 Leachfield Disposal 7-13
7.5.4 Conversion to Individual Wastewater Systems 7-13
8. Alternative Site Evaluation 8-1
8.1 Methodology 8-1
8.2 Site Locations 8-1
8.3 Criteria 8-3
8.4 Criteria Weighting Factors 8-7
8.5 Raw Scores 8-8
8.6 Weighted Analysis 8-9
8.7 Results 8-10
8.8 Conclusion 8-10
9. References 9-1
Appendix A: Cost Estimates A-1

List of Figures

Figure 1-1. Pahala Existing Sewer Collection System and LCC Service Area 1-2
Figure 2-1. Pahala WWTP Service Area 2-2
Figure 3-1. Irrigation Demand Assessment 3-2
Figure 4-1. In-Channel Cylindrical Screen 4-2
Figure 4-2. Headworks 4-3
Figure 4-3. Activated Carbon Scrubber (GAC) 4-4
Figure 4-4. High Speed Floating Aerator 4-7
Figure 4-5. Normal Lagoon Configuration Schematic 4-7
Figure 4-6. Floating HDPE Shade Balls 4-10
Figure 4-7. Floating shade balls with current and turbulence in reservoir. 4-10
Figure 4-8. Subsurface Flow Constructed Wetland Concept 4-11
Figure 4-9. Typical Calcium Hypochlorite Feed System 4-13
Figure 4-10. Chlorine Contact Tank Configuration 4-15
Figure 4-11. Land Application System Schematic 4-19
Figure 4-12. Existing Drainage System 4-22
Figure 4-13. Flood Insurance Rate Map 4-24
Figure 4-14. Operations Building Preliminary Floor Plan 4-27
Figure 5-1. Preliminary Site Plan 5-2
Figure 5-2. Recommended Facility Process Schematic 5-3
Figure 5-3. Environmental Benefits of Proposed Project 5-7
Figure 7-1. Option 1 Schematic Diagram 7-1
Figure 7-2. Option 2 Schematic Diagram 7-2
Figure 7-3. Option 3 Schematic Diagram 7-2
Figure 7-4. Irrigation Demand Assessment 7-3
Figure 7-5. Option 3 Recycled Water Demand Assessment 7-3
Figure 7-6. Comparison of Irrigation Demands at Pahala and Kealakehe 7-4
Figure 7-7. Option 4 Schematic Diagram 7-5
Figure 7-8. Seasonal Storage Reservoir Analysis 7-6
Figure 7-9. Option 5 Schematic Diagram 7-7
Figure 7-10. Life-Cycle Costs of Options 7-9
Figure 7-11. Comparison of Electrical Energy Requirements 7-11
Figure 8-1. Pahala Site Alternatives 8-2

List of Tables

Table 2-1. Pahala WWTP Flow Projections 2-3
Table 2-2. Summary of Assumed Influent Characteristics 2-3
Table 2-3. Projected Influent Mass Loads 2-3
Table 2-4. Mass Loads to the Environment via Existing LCCs 2-4
Table 3-1. Applicable HAR 11-62 Land Disposal Requirements 3-3
Table 4-1. Normal Configuration Aeration and Mixing Requirements 4-8
Table 4-2. Lagoon Shade Ball Cover Application Parameters 4-9
Table 4-3. Calcium Hypochlorite Summary 4-13
Table 4-4. Chlorine Demand 4-14
Table 4-5. Chlorine Contact Tank 4-14
Table 4-6. UV Disinfection Design Summary 4-16
Table 4-7. Estimated Disinfection Costs 4-17
Table 4-8. Ultraviolet Disinfection – Advantages and Disadvantages 4-17
Table 4-9. Potential Land Application System Tree Species 4-18
Table 4-10. Potential Water Demands 4-20
Table 5-1. Preliminary Design Criteria 5-4
Table 5-2. Environmental Benefits of Proposed Project 5-7
Table 5-3. Pahala WWTP Order of Magnitude Construction Cost Estimate 5-8
Table 5-4. Pahala WWTP Full Buildout Flow Projections 5-8
Table 6-1. Implementation Schedule 6-1
Table 7-1. Summary of Capital Cost Estimates 7-7
Table 7-2. Summary of O&M Cost Estimates 7-8
Table 7-3. Summary of Annual Recycled Water Sale Proceeds 7-8
Table 7-4. Summary of Life-Cycle Cost Estimates 7-9
Table 7-5. Comparison of Operational Labor Requirements 7-10
Table 7-6. Comparison of Operator Certification Requirements per HAR 11-61 7-10
Table 8-1. Environmental, Social and Cultural Criteria 8-3
Table 8-2. Location and Site Characteristics 8-4
Table 8-3. Collection System and Service Area Criteria 8-5
Table 8-4. Land Use and Availability Criteria 8-6

Table 8-5. Relative Weighting Factors 8-7
Table 8-6. Alternatives Analysis – Raw Scores 8-8
Table 8-7. Alternatives Analysis – Weighted Scoring 8-9
Table 8-8. Alternative Site Ranking 8-10

List of Abbreviations

AB	aggregate base
AC	asphalt concrete
BMP	Best Management Practices
BOD_5	5-day biochemical oxygen demand
CCH	City and County of Honolulu
cfs	cubic feet per second
COH	County of Hawaii
CFR	Code of Federal Regulations
DNA	deoxyribonucleic acid
DEM	Department of Environmental Management
DOH	Department of Health
ELLF	end-of-lamp-life
FIRM	Flood Insurance Rate Map
FOG	fats, oils, and grease
ft^3	cubic feet
FTE	full-time equivalent
GAC	granular activated carbon
gpm	gallons per minute
H_2S	hydrogen sulfide
HAR	Hawaii Administrative Rules
HDPE	high density polyethylene
HELCO	Hawaii Electric Light Company
hp	horsepower
hp/Mgal	horsepower per million gallons
hr	hour
hp-hr	horsepower-hour
L	liter
lbs	pounds
LCC	large capacity cesspools
LPHO	low pressure high output
MBR	membrane bioreactor
Mg	milligrams
Mgal	million gallons
mm	millimeter
MSL	mean sea level
N	nitrogen
NPV	net present value
O&M	Operation and Maintenance
P	Phosphorus
Psi	pounds per square inch
RNA	ribonucleic acid
ROW	right-of-way
scfm	standard cubic feet
SCS	Soil Conservation Service
SR	slow rate
TSS	total suspended solids
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency
UV	ultraviolet
WQV	Water Quality Volume
WWTP	Wastewater Treatment Plant

This page intentionally left blank.

Section 1

Introduction

1.1 Background

The town of Pahala is located in the Kau district of the Island of Hawaii. According to the 2010 United States Census, the town population is approximately 1,350 persons.

The Pahala community was established as the result of the sugar operations of the C. Brewer Company. A portion of the community is serviced by a sewer system that was privately built, owned, and operated by the C. Brewer Company. The wastewater collected by the sewer system discharges into large capacity "gang" cesspools. Many years after its establishment, the private sewer system ownership was conveyed to the County of Hawaii (COH) Department of Environmental Management (DEM).

In 1998, the U.S. Environmental Protection Agency (USEPA), promulgated regulations, 40 Code of Federal Regulations (CFR) 144.14, that require the elimination of large capacity "gang" cesspools (LCCs). The County intends to construct a new sewer collection system located within public right-of-way (ROW) and replace the existing LCCs with a wastewater treatment plant to address the wastewater treatment and disposal needs of the Pahala community.

This report summarizes a proposed wastewater treatment plant (WWTP) needed in order to treat and dispose of the wastewater flow that is currently discharged to the LCCs, plus additional sewer connections. The report presents the existing and estimated future flows and loads to the treatment plant, the proposed treatment processes, recommendation for the WWTP upgrades needed to meet the future treatment needs, and an initial opinion of the cost to construct the improvements project.

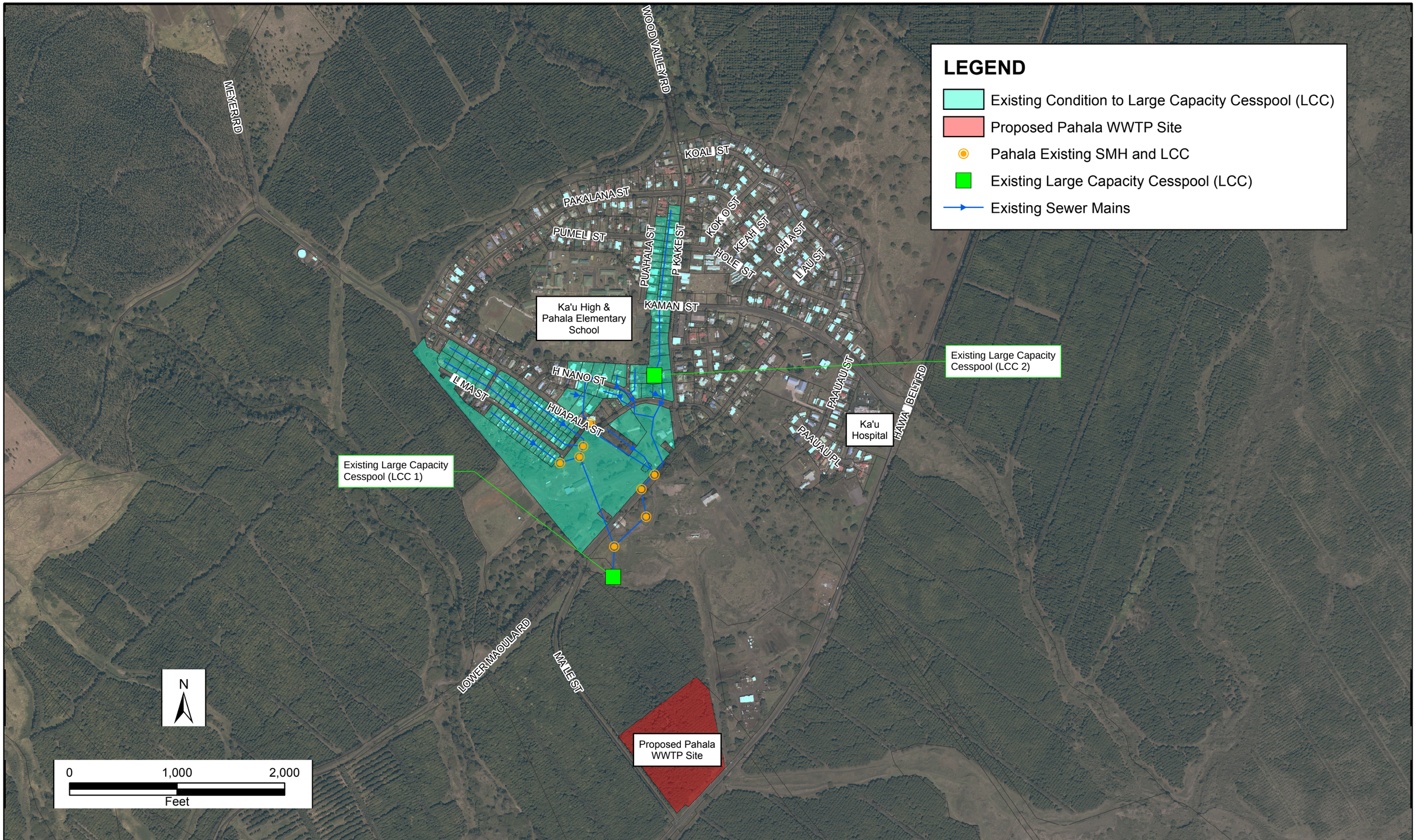
1.2 Existing System

Figure 1-1 shows the collection system network and service areas for the LCCs. The collection system is a network of gravity sewers that discharge to two existing LCCs. A detailed analysis of the existing wastewater collection system was completed by others (M&E Pacific, December 2004). The report concluded that the Pahala community existing sewer system consists of about 3,000 linear feet of 6-inch diameter and 10,000 linear feet of 4-inch diameter pipelines. Residential laterals connect to 4-inch sewers that discharge into 6-inch sewer mains, predominately found in private property, which transmit wastewater to the LCCs. There are approximately 8 manholes in the sewer system. There are no pump stations and the system is not designed to collect stormwater.

1.3 Report Contents

Section 2 presents flow and load projections for the new WWTP. Section 3 evaluates effluent management options, and the treatment requirements for the preferred option. Section 4 presents evaluations conducted to develop the preliminary design of the proposed WWTP, which is presented in Section 5. An implementation plan is briefly presented in Section 6, followed by discussion of other treatment options that were considered and evaluated. The report concludes with a site selection consideration in Section 8.

This page intentionally left blank.



Brown AND Caldwell

SCALE AS SHOWN

JOB NO.: 150440

PAHALA WASTEWATER TREATMENT PLANT

Pahala Existing Sewer Collection System and LCC Service Area

FIGURE

1-1

Section 2

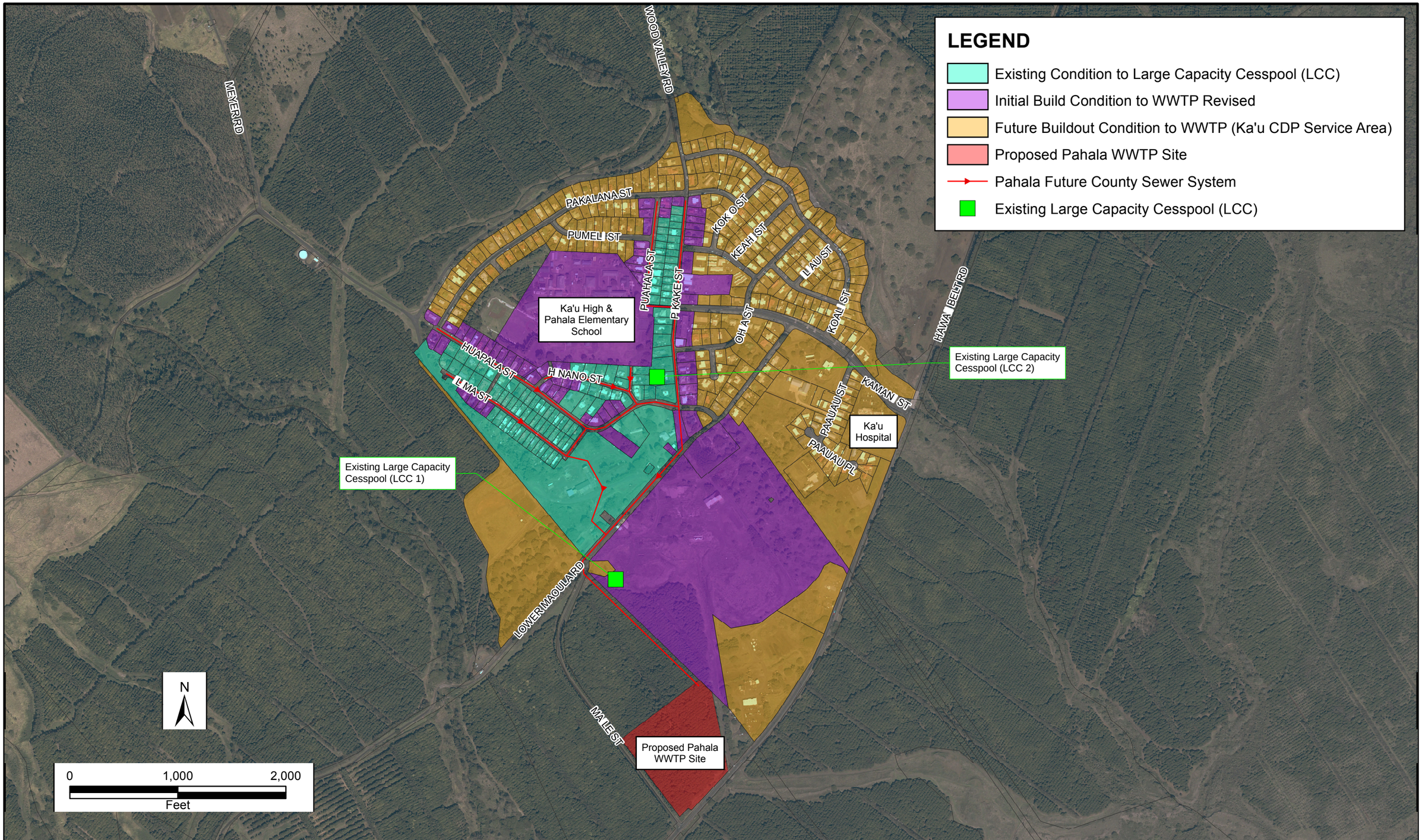
Flow and Load Projections

This section summarizes the flow and load projections for the new WWTP.

2.1 Service Area

Within the town of Pahala, there is an existing wastewater collection that services approximately 109 properties. The collection system is currently located within easements in private properties and is treated and disposed through two LCCs. Figure 2-1 shows the service area for the new WWTP. The Kau Community Development plan indicates that the sewer system may eventually be expanded to service the entire community; however, the initial collection system and WWTP presented in this report will service the properties currently connected to the LCCs or located adjacent to the new collection system. Although this report does not include design for the full buildout service area, the proposed WWTP has been designed to accommodate modifications within the proposed 14.9-acre site for the anticipated future expansion of the service area.

This page intentionally left blank.



Brown AND Caldwell

SCALE AS SHOWN

JOB NO.: 150440

PAHALA WASTEWATER TREATMENT PLANT

Pahala WWTP Service Area

FIGURE

2-1

2.2 Flow Projections

Wastewater flow projections were developed using the City and County of Honolulu's (CCH) current (2017) wastewater standards. Table 2-1 summarizes the flow projections.

Table 2 1. Pahala WWTP Flow Projections

Description	Value	Peaking Factor
Average dry weather flow	189,000 gallons per day	1.0
Peak day wet weather flow	662,000 gallons per day	3.5
Peak hour wet weather flow	630 gallons per minute	4.8

The WWTP will be designed to provide an average dry weather flow capacity of 190,000 gallons per day.

2.3 Influent Characteristics

The properties within the existing service area are primarily residential, but do include several commercial, apartment, and industrial zoned parcels. The wastewater characteristics of the WWTP influent are assumed to be similar to typical domestic wastewater. Table 2-2 provides a summary of the assumed influent characteristics.

Table 2 2. Summary of Assumed Influent Characteristics

Parameter	Value
5-day biochemical oxygen demand (BOD_5)	300 mg/L
Total suspended solids (TSS)	300 mg/L
Total nitrogen	40 mg/L
Total phosphorus	7 mg/L

2.4 Influent Mass Loads

Table 2-3 summarizes the projected loads to the WWTP, based on the proposed average dry weather capacity of 190,000 gallons per day and the influent characteristics presented in Table 2-2.

Table 2 3. Projected Influent Mass Loads

Description	Value
BOD_5	480 lbs./day
TSS	480 lbs./day
Total nitrogen	60 lbs./day
Total phosphorus	10 lbs./day

2.5 Mass Loads to the Environment via Existing LCCs

Currently, 109 properties discharge without treatment to two LCCs, as shown in Figure 2-2. These types of cesspools are a public health and environmental concern because of their likelihood of releasing disease causing pathogens and other contaminants, such as nitrate, to groundwater. The current annual mass loads to the environment via the existing LCCs based on the flow projections and assumed wastewater characteristics presented above are summarized in Table 2-4.

Table 2 4. Mass Loads to the Environment via Existing LCCs

Parameter	Annual Load
BOD_5	174,000 lbs./year
TSS	174,000 lbs./year
Total N	23,000 lbs./year
Total P	4,000 lbs./year

Section 3

Effluent Management Options and Regulatory Requirements

Effluent management options are evaluated in this section, followed by an assessment of regulatory requirements for the recommended effluent management system.

3.1 Effluent Management Options

Effluent management options are evaluated below.

3.1.1 Ocean Discharge

Ocean discharge of treated effluent is not considered a viable option for this small community due to the long distance to the shoreline (approximately 3 miles), high cost to construct an outfall, stringent receiving water quality standards, high receiving water monitoring cost due to the distance to Hilo harbor, and difficulty and length of time required to secure the required permits.

3.1.2 Subsurface Disposal via Injection Wells

Per Hawaii Administrative Rules (HAR), Title 11, Chapter 23, disposal to groundwater via an injection well is not allowed mauka of the State of Hawaii Department of Health (DOH) Underground Injection Control (UIC) line. Since the town of Pahala is located mauka of the UIC line, an injection well is not a viable option.

3.1.3 Water Recycling

An irrigation assessment was prepared to assess the viability of water recycling as the primary effluent management system, assuming the recycled water would be used to irrigate macadamia nut trees. Figure 3-1 is a summary of the assessment that shows there is typically no irrigation demand for six months of the year due to high rainfall. In addition, the DOH requires that all water recycling programs have a 100 percent backup disposal system in place to handle flow that does not meet recycled water quality standards or when recycled water supply exceeds demand. Therefore, water recycling is not a viable primary effluent management strategy for the community. However, water recycling treatment, storage, and distribution systems could be added in the future.

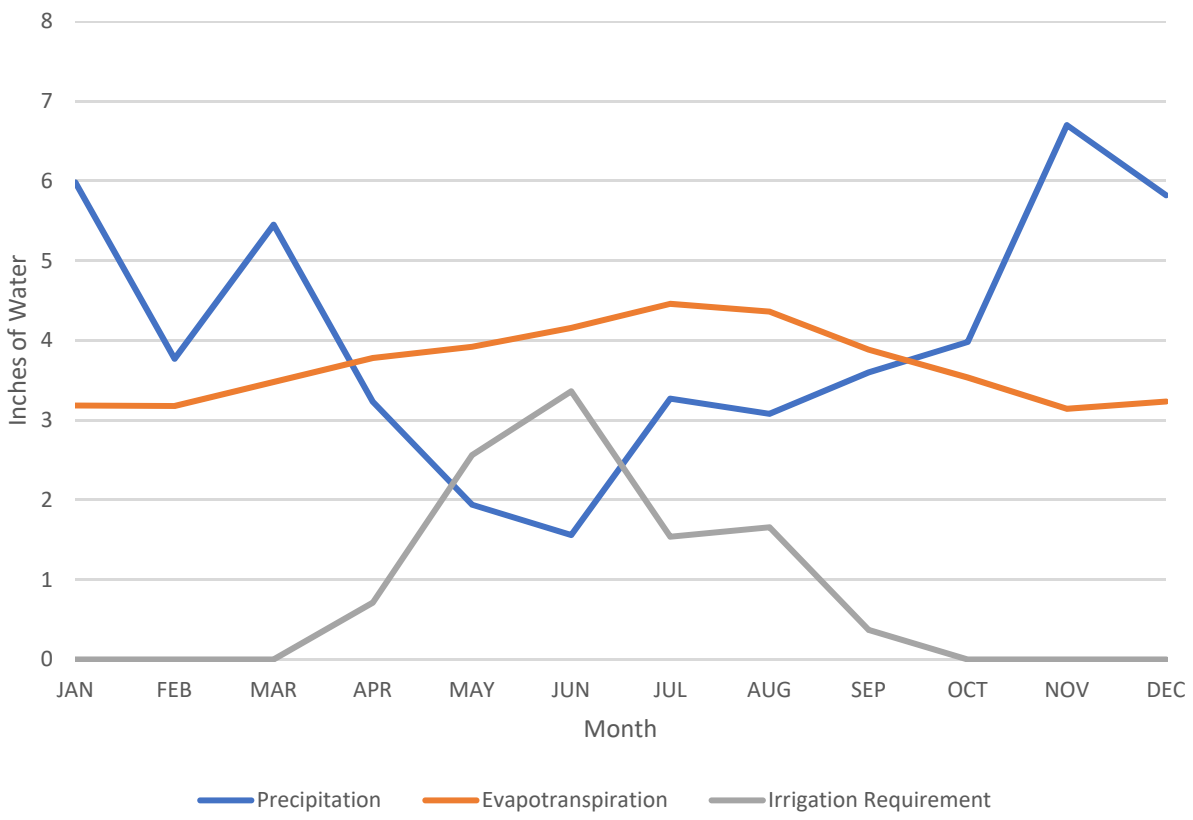


Figure 3-1. Irrigation Demand Assessment

3.1.4 Land Treatment

The USEPA defines land treatment as "the application of appropriately pre-treated municipal and industrial wastewater to the land at a controlled rate in a designed and engineered setting. The purpose of the activity is to obtain beneficial use of these materials, to improve environmental quality, and to achieve treatment goals in a cost-effective and environmentally sound manner" (USEPA, September 2006).

Land treatment systems rely on soil and vegetation to achieve treatment objectives, rather than energy-intensive mechanical equipment. As such, they are considered to be a form of "natural" treatment (Crites, et. al., 2014).

Land treatment is not a new concept. "Land application of wastewater was the first 'natural' technology to be rediscovered (after passage of the Clean Water Act of 1972). In the 1840s in England, it was recognized as avoiding water pollution as well as returning nutrients in wastewater back to the land. In the 19th century it was the only acceptable method for waste treatment, but it gradually slipped from use with the invention of modern devices" (Crites, et. al., 2014).

The soils at the proposed WWTP location are suitable for slow rate (SR) land treatment. SR land treatment consists of irrigation of land and vegetation with effluent. Significant treatment is provided as the water percolates through the soil. The vegetation uses the nutrients in the effluent as fertilizer, and transpires a portion of the applied water.

3.1.5 Drain Field

A drain field (i.e., leach field) could potentially be constructed for subsurface disposal of treated effluent. Preliminary assessment of the concept based on the site soil characteristics indicate approximately 20,000 linear feet of drain field trench would be required to accommodate the anticipated flow. It would be difficult to evenly distribute effluent throughout a drain field of this size. In addition, DOH regulations require a redundant drain field for subsurface disposal systems, making this option expensive to implement. This option is considered impractical for the community.

3.1.6 Recommendation

A slow rate land treatment system is recommended for effluent management for the community.

3.2 Treatment Requirements

The DOH regulates land treatment as "land disposal" per Hawaii Administrative Rules (HAR) 11-62. Table 3-1 lists the applicable effluent requirements for land disposal applicable to the project that were in effect at the time this report was prepared.

Table 3 1. Applicable HAR 11 62 Land Disposal Requirements

Description	Value	HAR Reference
BOD_5	30 mg/L monthly average 60 mg/L peak	11-62-26
TSS	30 mg/L monthly average 60 mg/L peak	11-62-26
Disinfection	Except for subsurface disposal systems, continuous disinfection of the treated effluent shall be provided	11-62-24
Setbacks	Treatment units shall be not less than 25 feet from property lines nor less than 10 feet from any building	11-62-23.1
Public accessibility control	6-foot-high fence surrounding treatment units	11-62-08

This page intentionally left blank.

Section 4

Wastewater Treatment Evaluations

This section presents the evaluations conducted in development of the proposed WWTP.

4.1 Preliminary Treatment

The preliminary treatment system will include screening, influent flow measurement, and influent sampling equipment.

4.1.1 Screening

Screening is recommended to protect the downstream system operations from large objects, debris, and rags that can be present in wastewater. Aerated lagoon treatment systems require a minimum of coarse screens to protect the aeration equipment. The industry trend is towards finer screening systems that remove greater amounts of debris from the waste stream; screens with 6-millimeter (mm) (¼-inch) openings are frequently used for activated sludge treatment systems. An aerated lagoon treatment system can benefit from ¼-inch screening to reduce the amount of floatable debris on the lagoon shoreline, creating a cleaner facility that is less attractive to birds. Since the Pahala WWTP will not be continuously staffed, a screening process requiring minimal attention is desirable. Furthermore, the screenings volume is expected to be small, subsequently screenings disposal is expected to be infrequent; weekly at most. Therefore, the screenings must be washed of organic debris to prevent the accumulation of nuisance odors and flies in the screenings barrel or bag between screening disposal events.

4.1.1.1 In-channel cylindrical screen

We recommend an in-channel cylindrical screen for this installation. The in-channel cylindrical screen combines screening, screenings washing, dewatering, compacting, and bagging/disposal within a single unit. The screening portion consists of an inclined screen basket inserted into the wastewater channel. The screening basket can consist of bars, perforated plates or sieves, depending on the application and clear opening required. The controls can be set to allow a mat to build up on the screening surface, allowing finer screening of the wastewater. Controlled by head loss, a rake arm starts rotating within the screen basket, pushing the screenings off the rake and into a perforated screenings hopper located at the screen's central axis. A shafted auger along the screen axis conveys the screenings from the hopper through an inclined tube, which dewaters and compacts the screenings. The tube includes a perforated dewatering section. The discharged screenings are about 40-percent dry, and can be discharged into a bin or directly into a bagging system. Figure 4-1 illustrates the process. Manufacturers include Lakeside and Huber. The key benefit to this system is the integrated screenings washing system, minimizing additional screenings handling and odor potential.

For this installation, the headworks will include two in-channel cylindrical screens, one will be on-line when the other is redundant, plus a bypass channel with manually cleaned bar rack.

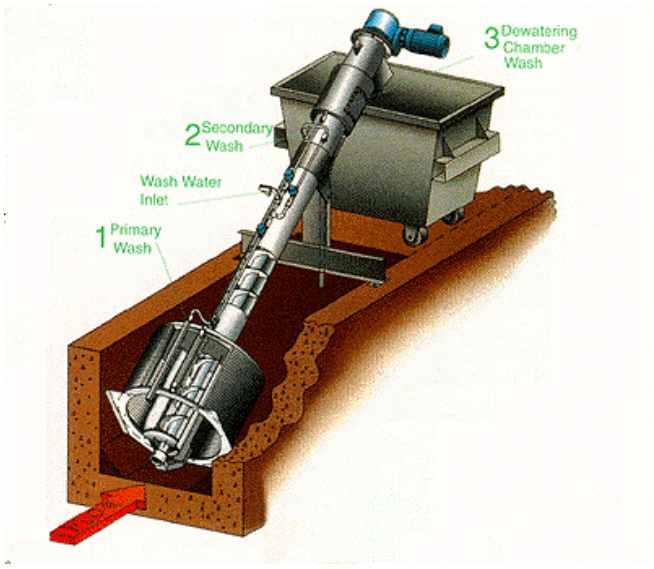


Figure 4-1. In-Channel Cylindrical Screen

4.1.2 Influent Flow Measurement

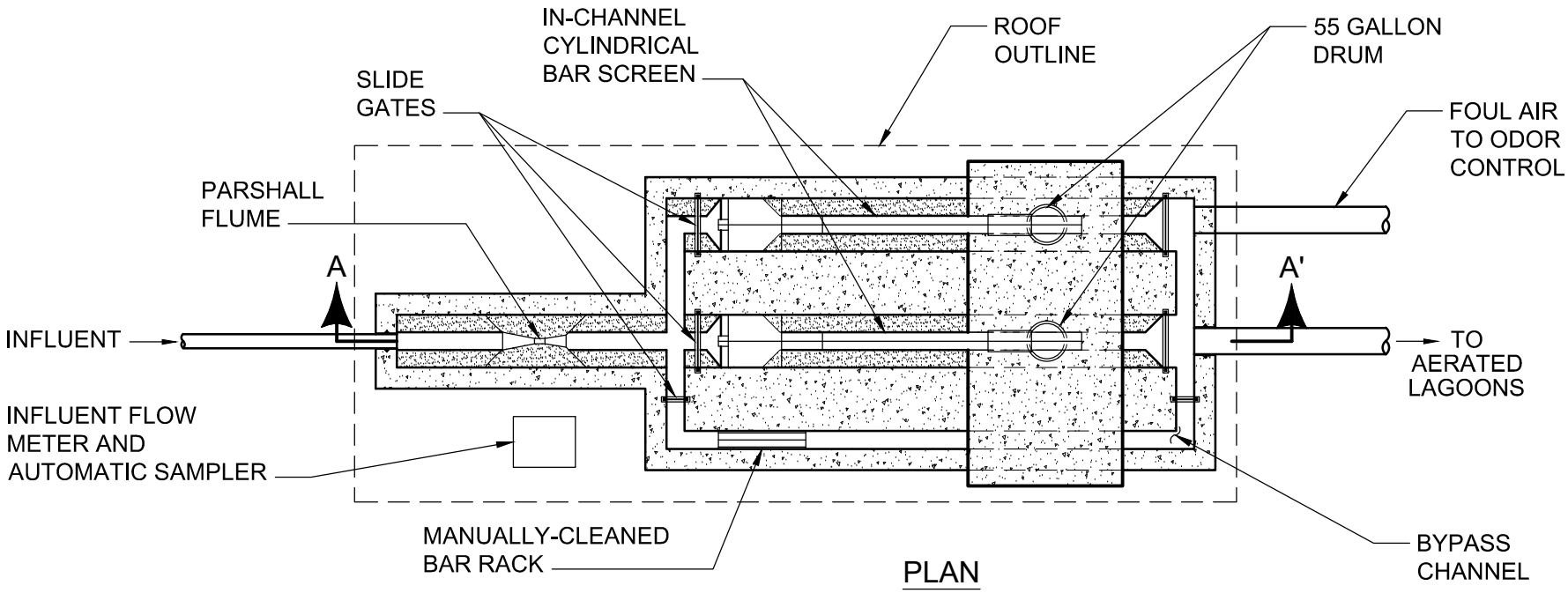
Influent flow measurement is recommended to allow assessment of flows and loads to the biological treatment process, and to assess the biological treatment process performance. A Parshall flume will be provided upstream of the screening system to continuously record influent flow rates. Parshall flumes work well for influent measurement because the flume can operate in an open-channel configuration, can accommodate wide ranges of flows, and is self-cleaning. A straight approach length of at least 20 times the flume throat width will be provided upstream of the flume to provide favorable hydraulic conditions.

4.1.3 Influent Flow Sampling

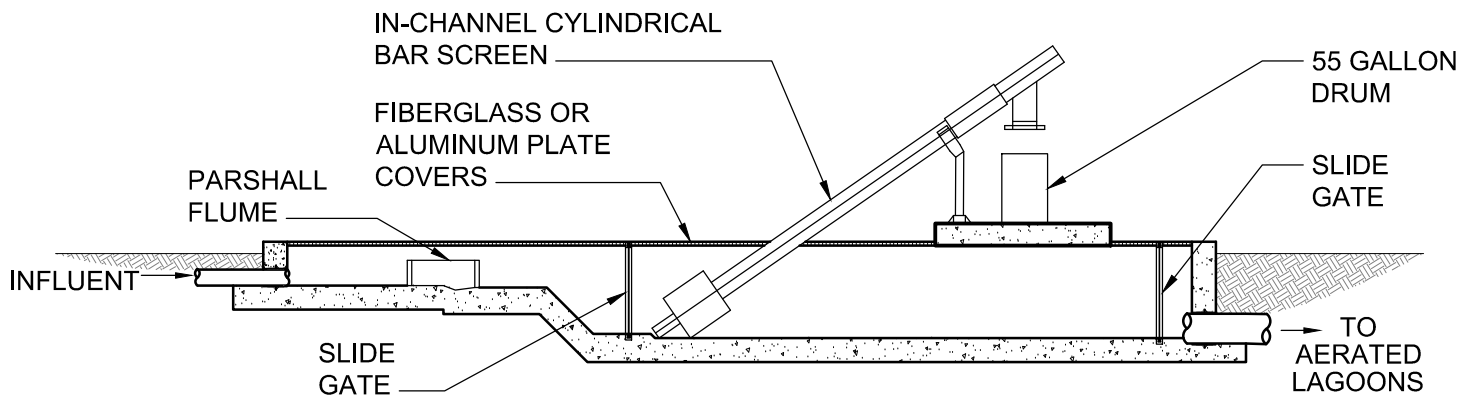
An automatic refrigerated composite sampler is recommended to allow influent composite samples to be collected. Influent composite samples, when combined with influent flow measurement, can be used to calculate influent mass loading rates to the WWTP to assess the treatment performance and optimization of aeration rates in the biological treatment process. Periodic influent sampling is also recommended to monitor for changes in the influent characteristics.

4.1.4 Preliminary Design of Headworks

Figure 4-2 shows a plan and section of the proposed headworks. Influent wastewater will enter the upstream end of the headworks channel. Stop plates will be used to divert the flow to one of the two the in-channel cylindrical screens, or to the manually-cleaned bar rack. The slide gates will be designed to allow automatic overflow to the other channels in the event of mechanical screen failure. The washed and compacted screenings will be deposited in a bag or 55-gallon drum for periodic disposal. The Parshall flume and automatic refrigerated composite sampler will be located upstream of the screens. The channels will be covered with fiberglass or aluminum plate to facilitate foul air collection, which will be conveyed to an odor control unit. In addition, a free-standing roof structure will be constructed over the headworks to protect the operators and equipment from rain and sun.



PLAN



SECTION A - A'

Brown AND Caldwell	SCALE: JOB NO: 150440	PAHALA WASTEWATER TREATMENT PLANT HEADWORKS	FIGURE 4-2

4.1.5 Odor Control

A notorious location for foul odor is the headworks of a wastewater treatment plant. This odor is caused by hydrogen sulfide (H_2S), which is formed under anaerobic conditions of the wastewater collection system. Due to H_2S low solubility in wastewater, when there is an excessive concentration of H_2S in the wastewater or if there is turbulence, H_2S gas escapes into the atmosphere. This release produces the distinct rotten egg smell. In addition to H_2S, there are other foul odorous compounds that can be released from wastewater, such as ammonia, amines, diamines, mercaptans, skatole, and organic sulfides.

Treatment of foul odors can be approached in two ways: preventing odors through liquid treatment or controlling odors in the gas phase. While liquid treatment provides control of odors prior to their release, gas phase treatment involves the collection and treatment of gases once they have been released from wastewater. Treatment methods can be aimed at one type of odor, or can treat a range of odors.

4.1.5.1 Granular Activated Carbon

A granular activated carbon (GAC) scrubber is recommended for the Pahala WWTP headworks. A GAC scrubber passes odorous air through a bed of activated carbon, which adsorbs the odorous constituents within the pore spaces of the carbon.

Chemical oxidation or reduction of some compounds can also occur. As pore spaces become occupied, efficiency degrades, and the carbon must be replaced or regenerated. Carbon is most effective on higher molecular weight molecules such as the organic sulfur compounds, which makes it the technology of choice. Package GAC scrubbers are available for small headworks and vessels can be situated vertically, horizontally, or radially to optimize footprints and reduce structure elevation profiles. Figure 4-3 illustrates the process. The County currently operates GAC scrubbers at other facilities, and purchases the GAC media in bulk to reduce costs.

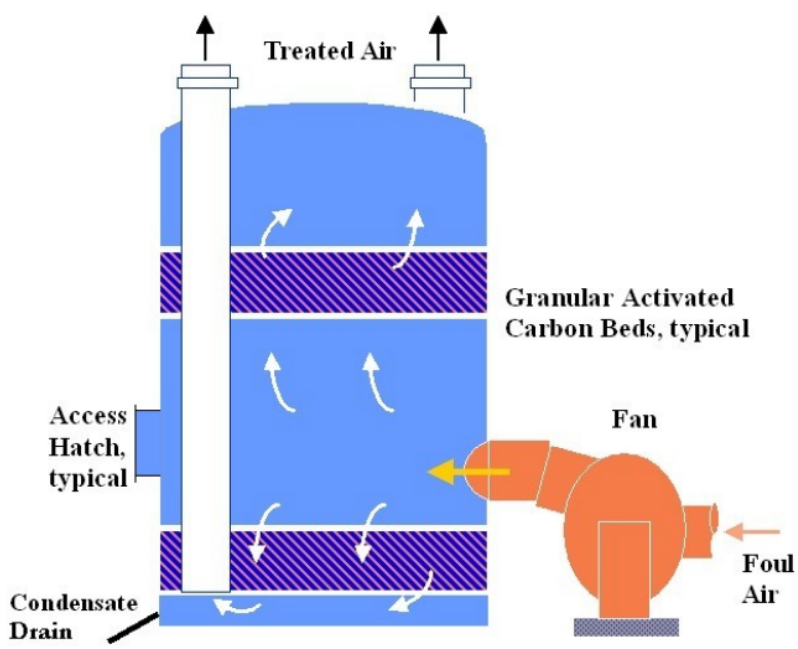


Figure 4-3. Activated Carbon Scrubber (GAC)

4.2 Aerated Lagoon Treatment System

The biological wastewater treatment needs at the Pahala WWTP will be met by a series of aerated lagoons. A floating cover will be installed on the last cell to reduce algae in the effluent. The preliminary design of the aerated lagoon treatment system is developed in this section.

4.2.1 Aerated Lagoon Kinetics

The Pahala WWTP design is reliant on partial mix aerated lagoon environments to provide the community's wastewater treatment needs for the initial buildout condition. Partial mix aerated lagoon kinetics are described below.

4.2.1.1 Partial mix model

Partial mix aerated lagoons are based on the concept of allowing solids to settle in lagoons while providing only enough aeration and mixing to meet the oxygen requirements of the naturally occurring micro-organisms in the system. The solids tend to settle in areas of the lagoon that are subject to less mixing energy, where they anaerobically decompose. Infrequent sludge removal is required to maintain sufficient lagoon treatment volume.

Removal of BOD_5 in partial-mix aerated lagoons depends on the hydraulic detention time. The design model for partial mixed ponds of equal size in series is (Crites, et. al., 2006):

$$\frac{Cn}{Co} = \frac{1}{[1+(kt/n)^n}$$

Where Cn = effluent BOD_5 concentration in cell n, mg/L

Co = influent BOD_5 concentration, mg/L

k = partial-mix first-order reaction rate constant, day^{-1}

t = total hydraulic residence time in the lagoon system, day

n = number of cells in the series

If the lagoons in a system are of unequal size, then the equation must be applied to each lagoon in the series. The Ten-States Standards recommends using a value of 0.276 day^{-1} at 20 °C for the reaction rate constant (Great Lakes – Upper Mississippi River Board, 1997).

4.2.1.2 Mixing in Lagoon Systems

The energy required for mixing in aerated lagoon systems is generally provided by the aeration system. For partial mix systems the aeration system is sized to provide enough oxygen to maintain aerobic conditions and no more. For mechanical aeration systems energy input of at least 30 horsepower per million gallons (hp/Mgal) of lagoon volume is required to keep solids in suspension (Rich, 1999).

4.2.2 Aeration in Lagoon Systems

Oxygen requirements in aerated lagoon systems are based on the organic loading entering the cell. Supplying oxygen at a rate of 1.5 times the BOD_5 mass entering the cell has been found to be sufficient to treat the wastewater. The following equation is used to estimate the oxygen transfer rate (Crites, et. al., 2006):

$$N = \frac{N_a}{\alpha\left[\frac{(C_{sw} - C_L)}{C_S}\right](1.025)^{(Tw-20)}}$$

Where N = Equivalent oxygen transfer to tap water at standard conditions (lbs/hr)

N_a = Oxygen required to treat the wastewater (lbs/hr)

α = (oxygen transfer in wastewater)/(oxygen transfer in tap water)

C_{sw} = $\beta(C_{ss})P$ = oxygen saturation value of the waste, mg/L

β = wastewater saturation value/tap water oxygen saturation value = 0.9

C_{ss} = tap water oxygen saturation value at temperature Tw

P = ratio of barometric pressure at the site to barometric pressure at sea level

C_L = minimum dissolved oxygen concentration to be maintained

C_S = oxygen saturation value of tap water at 20°C and 1 atm pressure

T_w = wastewater temperature, °C

Oxygen can be supplied to aerated lagoon systems using mechanical aerators or diffused aeration systems. Mechanical aerators are commonly rated by the number of pounds of oxygen the units will supply under standard conditions per horsepower-hour (lbs. O_2/hp-hr). Diffused air requirements are calculated using the following equation (Crites and Tchobanoglous, 1998):

$$Q_{air} = \frac{W_{oxygen}}{(AOTE)(O_2)(\gamma_{air})(1440)}$$

Where Q_{air} = Required air flow (ft^3/min)

W_{oxygen}= Oxygen requirements (lbs/day)

$AOTE$ = Actual oxygen transfer efficiency, expressed as a fraction

O_2 = Fractional percent of oxygen in air by weight (0.2315)

γ_{air} = Specific weight of air (0.075 lbs/ft^3 at 1 atmosphere and 20°C

The oxygen transfer efficiency of a diffused air system is a function of the air bubble size and the depth of the water column. Smaller air bubbles result in higher oxygen transfer efficiencies than larger bubbles, as do diffusers that are set at deeper depths within the water column.

4.2.2.1 High speed floating aerators

High-speed floating aerators are commonly used for aerated lagoon systems. The units consist of a motor and impeller attached to a float. The units are typically anchored to the lagoon shore using cables. High-speed floating aerators are designed to pump water from the lagoon and spray it into the air, allowing oxygen to diffuse into the water droplets. The high-speed floating aerators can be

outfitted with draft tubes to enhance deep water lagoon mixing or anti-erosion plates to ensure water is drawn from the surface. Figure 4-4 shows a typical high-speed floating aerator.

Figure 4-4. High Speed Floating Aerator

Advantages of this system include low capital costs, relatively high oxygen transfer efficiency, good mixing efficiency, and simple operation and maintenance. The chief disadvantage of the system is the creation of aerosols as the lagoon water is sprayed into the air.

Manufacturers of this type of aerator include Aqua-Aerobics, Aerator Products and Europlec/Aeromix Systems Inc.

High-speed floating aerators are recommended for the Pahala WWTP due to their relatively high oxygen transfer efficiency, low capital cost, and simple operation and maintenance. High-speed floating aerators are easy to remove from service, and can be easily moved between lagoons or cells, if needed.

4.2.3 Aerated Lagoon Configuration

The normal operating condition for the Pahala WWTP will be to operate the four lagoon cells in series as partial mix environments. Figure 4-5 is a schematic representation of the normal operating mode. The fourth cell will be outfitted with a floating cover to preclude algae growth. Having four lagoons will allow the County to take a lagoon out of service for maintenance.

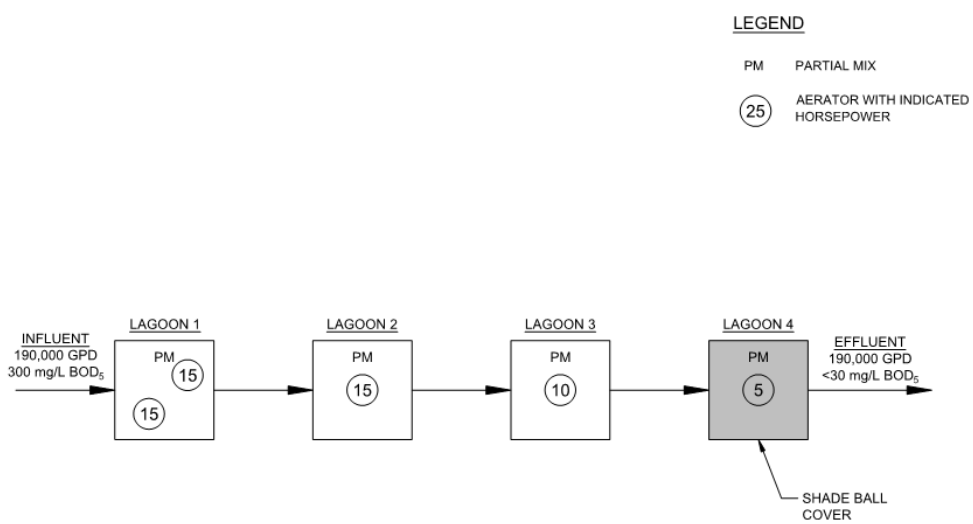


Figure 4-5. Normal Lagoon Configuration Schematic

Table 4-1 summarizes the results of the aeration and mixing calculations for the normal operational configuration treating the design average dry weather flow rate of 190,000 gallons per day. Comparison of the minimum aerator requirements shown in Table 4-1 with the proposed aerator layout shown in Figure 4-4 reveals that the aerator power supplied exceeds the minimum requirements. An aerator control system will be provided that will intermittently turn the aerators on and off in accordance with the operator settings to supply sufficient oxygen to the system.

Table 4 1. Normal Configuration Aeration and Mixing Requirements

Cell	Volume (gal)	Influent BOD_5 (mg/L)	Effluent BOD_5 (mg/L)	Minimum Aerator Requirement (hp)	Mixing Density (hp/Mgal)
1	80,000	300	139	27	34
2	80,000	139	64	13	16
3	80,000	64	30	6	7
4	80,000	30	<30	2	3

4.2.4 Lagoon Liner

Lagoon liners are required to prevent wastewater seepage into the ground. The liner will be exposed to sunlight, so resistance to ultraviolet light (UV) degradation is a key factor in the selection of the liner material, as is the compatibility of the material with typical domestic wastewater characteristics and ease of liner maintenance. An 80-mil textured high density polyethylene (HDPE) geomembrane is recommend for this application.

Textured HDPE is known to have excellent UV resistance, good chemical resistance, and generally is not affected by fats, oils, and grease (FOG). Maintenance of HDPE requires a specialty contractor who can complete fusion weld repairs. Unlike smooth HDPE, textured HDPE presents minimal slipping hazard to operations personnel. Furthermore, the anticipated useful service of an HDPE liner in typical Hawaii municipal wastewater treatment conditions is 25 to 30 years.

4.2.5 Lagoon Cover

In the normal operating mode, the final cell in the lagoon series will be covered in order to deprive algae of sunlight. This will reduce the algae concentration, which can increase total suspended solids (TSS) levels in the system effluent. The cover should float on the surface of the water, be UV resistant, suitable for windy environments, and allow for rainwater to pass through the cover to prevent ponding. A floating shade ball cover is proposed for this installation.

Floating shade balls covers have been used for decades in in the mining, water and wastewater treatment industries. Figure 4-6 shows the design elements of a typical shade ball, and Figure 4-7 shows how shade balls provide cover on a reservoir. In addition to reducing algae growth, shade ball covers deter waterfowl from storage ponds. The black, UV-stable HDPE resin has known to withstand a range of challenging chemical and environmental conditions. Table 4-2 summarizes technical data for the balls.

Table 4 2. Lagoon Shade Ball Cover Application Parameters

Requirement	Description
Algae Control	Balls – 90% shade coverage
Temperature	50^0C to 95^0C
Wind Resistance	Balls ballasted with potable water tested in winds of 120 mph (category 3 hurricane)
Waterfowl Safety	Waterfowl do not recognize ball-covered pond as a water body and will not nest on the unstable surface
Lifecycle/Warranty	The shade balls are warrantied for 10 years, with an expected resin life of 25+years
Operations and Maintenance	Self-cleaning, self-levelling and require little to no maintenance Balls will move out of the way of maintenance barge, and can be restrained with booms Little installation effort required Precipitation does not affect the cover
Sustainability	Resin is recyclable, paraben free and suitable for drinking water applications Ballast is potable water Resin can be made from recycled plastic
Environment	Balls have been installed in chemically harsh environments (mining industry), in drinking water reservoirs, and in tropical locations Balls reduce algae formation and corresponding disinfectant byproducts in chlorination applications

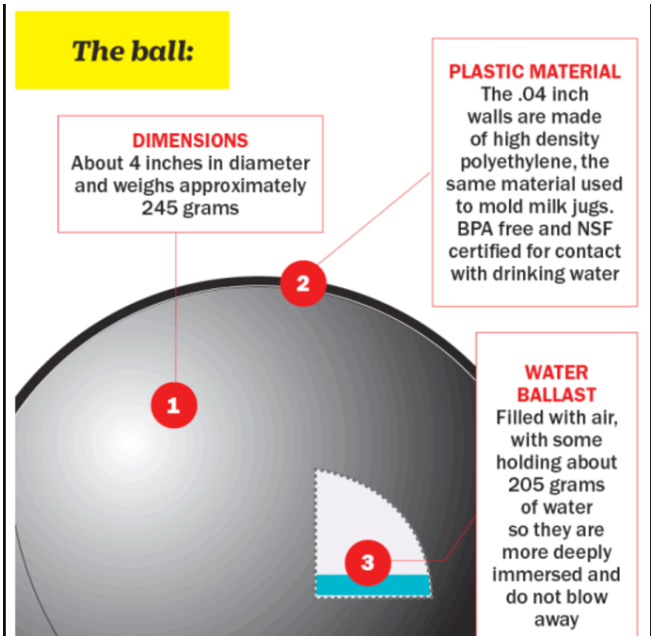


Figure 4-6. Floating HDPE Shade Balls

Figure 4-7. Floating shade balls with current and turbulence in reservoir.

4.2.6 Lagoon Sludge Management

Partial-mix aerated lagoons are designed to allow solids to settle to the bottom of the lagoon, forming a sludge layer. The sludge slowly anaerobically digests in the bottom of the lagoon. The mechanical aerators in the lagoon maintain an aerobic water cap at the surface of the lagoon that oxidizes any odors that are released from the anaerobic sludge layer at the bottom of the lagoon. Sludge is removed infrequently, typically every 15 to 30 years, when the sludge blanket thickness begins to affect treatment performance or in conjunction with lagoon liner replacement. Aerated lagoon operators typically monitor sludge blanket thicknesses semi-annually to assess sludge accumulation.

Sludge removal contractors are typically employed to dredge the solids, dewater, and haul to a landfill for disposal. Sludge from aerated lagoons is typically not offensive when dewatered due to the long residence time in the bottom of the lagoon.

Alternatively, the sludge can be recycled if a permitted land application site is available and the sludge meets State and Federal requirements for land application or composted with green waste at a permitted composting facility.

4.3 Subsurface Flow Constructed Wetland

A subsurface flow constructed wetland is recommended to provide additional treatment and polishing of the aerated lagoon effluent. It is anticipated that the aerated lagoon system will convert ammonia that is present in the wastewater influent into nitrate via a process called nitrification. A subsurface flow constructed wetland will remove this nitrogen from the wastewater via a process called denitrification. Reduction of nitrogen loading through the constructed wetland will decrease the area required for overland flow effluent management.

Subsurface flow wetlands consist of shallow lined basins that are filled with gravel media and planted with emergent wetland vegetation. Water is introduced to the gravel media layer and flows horizontally through the basin. The water level in the wetland is maintained below the gravel surface at all times. Treatment occurs through physical, chemical, and biological mechanisms as the water flows horizontally through the gravel media bed. Figure 4-8 is an illustration of the concept.

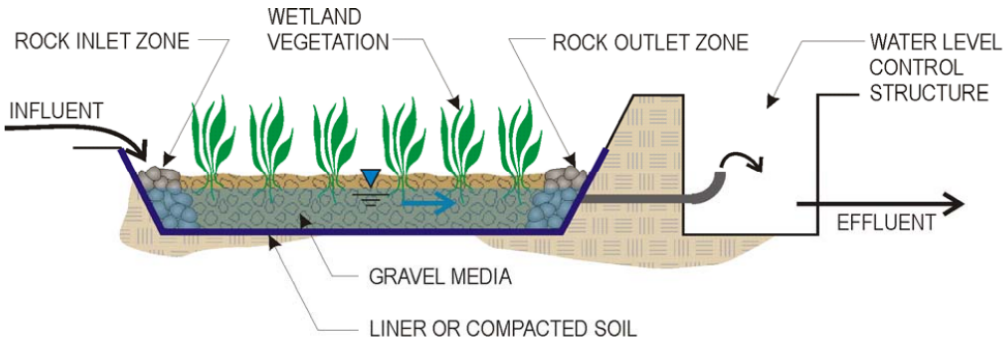


Figure 4-8. Subsurface Flow Constructed Wetland Concept

4.3.1 Denitrification in Subsurface Flow Constructed Wetlands

Denitrification is a biological process whereby nitrate molecules are transformed into nitrogen gas molecules by naturally-occurring bacteria. The denitrifying bacteria require five conditions for the process to occur:

- A place to grow.

- A source of nitrate.
- An anoxic (low-oxygen) environment.
- A source of carbon.
- Adequate water temperature.

The equation used to predict denitrification in subsurface flow constructed wetlands is shown below (Crites, et.al., 2014).

$$\frac{C_e}{C_o} = \exp(- \ _T t)$$

where:

C_e = effluent nitrate-nitrogen concentration (mg/L)

C_o = influent nitrate-nitrogen concentration (mg/L)

$_T$ = temperature-dependent rate constant = $1.00(1.15)^{(T-20)}$ days^{-1} when T>1°C

t = hydraulic residence time (days)

Subsurface flow constructed wetlands are capable of providing additional treatment benefits beyond nitrogen reduction, such as removal of organic carbon, suspended solids, phosphorus, metals, trace organics, and pathogens. The additional treatment benefits are not primary design parameters, but should be considered as additional polishing treatment benefits that may be realized for the Pahala WWTP.

4.4 Disinfection

Disinfection processes selectively kill pathogens or render them incapable of reproduction or harm to humans. Disinfection at WWTPs is employed for the purposes of protection of public health, reduction of organic matter, inorganics, nutrients, odor, aesthetics, and maintaining waste-assimilative capacity of receiving water bodies. The protection of public health through the control of disease-causing microorganisms is the primary reason for wastewater disinfection (WEF, 1996). As the last barrier of protection from pathogenic organisms, disinfection at WWTPs is an important process. To address disinfection, both a calcium hypochlorite system and a UV system were evaluated.

4.4.1 Calcium Hypochlorite

Calcium hypochlorite is the most common solid form of hypochlorite used for disinfection. It can be found as a powder, granules, pellets, or as tablets in concentrations up to 70 percent. Calcium hypochlorite will degrade in strength at a rate of 3 to 5 percent per year. Once applied to the wastewater, the chemistry is similar to that for sodium hypochlorite. Calcium hypochlorite decomposes in an exothermic reaction if exposed to moisture.

The solid can be directly applied to wastewater at very small WWTPs. Figure 4-9 shows a typical calcium hypochlorite feed system.

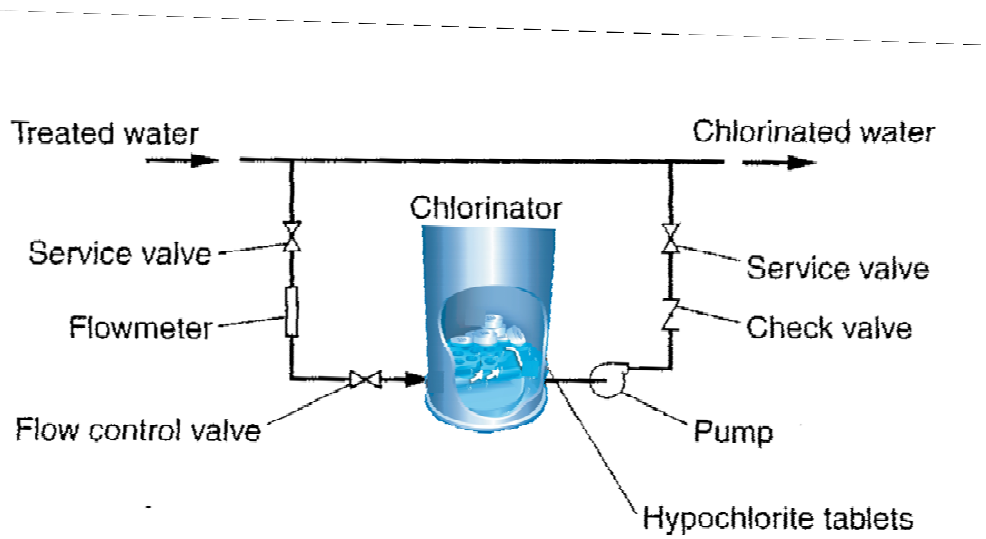


Figure 4-9. Typical Calcium Hypochlorite Feed System

The advantages of using calcium hypochlorite for disinfection at small, remote WWTPs is that it is available in concentrated form as powder, pellets, or tablets. This makes the transportation and storage of disinfectant optimal for small WWTPs. Table 4-3 summaries calcium hypochlorite characteristics.

Table 4 3. Calcium Hypochlorite Summary

Description	Characteristic
Transported form	Solid
Typical transported concentration	70%
Largest transported volume available	55 lb. pails
Decay Rate	Decays 3-5% per year
pH	N/A
Hazards	Toxic if ingested (usually through dust or liquid form)
Storage constraints	Must be stored in a cool, dry, dark place
Special equipment	Tablet feeder
Particular issues	Heats and combusts if not stored properly Scaling in pipes, Off gassing

4.4.1.1 Dose and Contact Time

The effectiveness of a chlorination system is highly dependent on the characteristics of the wastewater, the initial mixing and contact time, and the chlorine dose used. For nitrified effluent, the recommended dose is between 8 and 18 mg/L. The WWTP will discharge to a land application system during normal flow and wet weather periods when the secondary effluent will be diluted by precipitation falling onto the overland flow terraces. For planning purposes, a 10 mg/L dose was assumed to be sufficient for the WWTP for most circumstances, but equipment will be sized to

provide chemical feed at a rate of up to 100 lbs./day, which will ensure an adequate chlorine dose for peak wet weather discharge flows.

Table 4-4 lists the chlorine demand for various flow conditions.

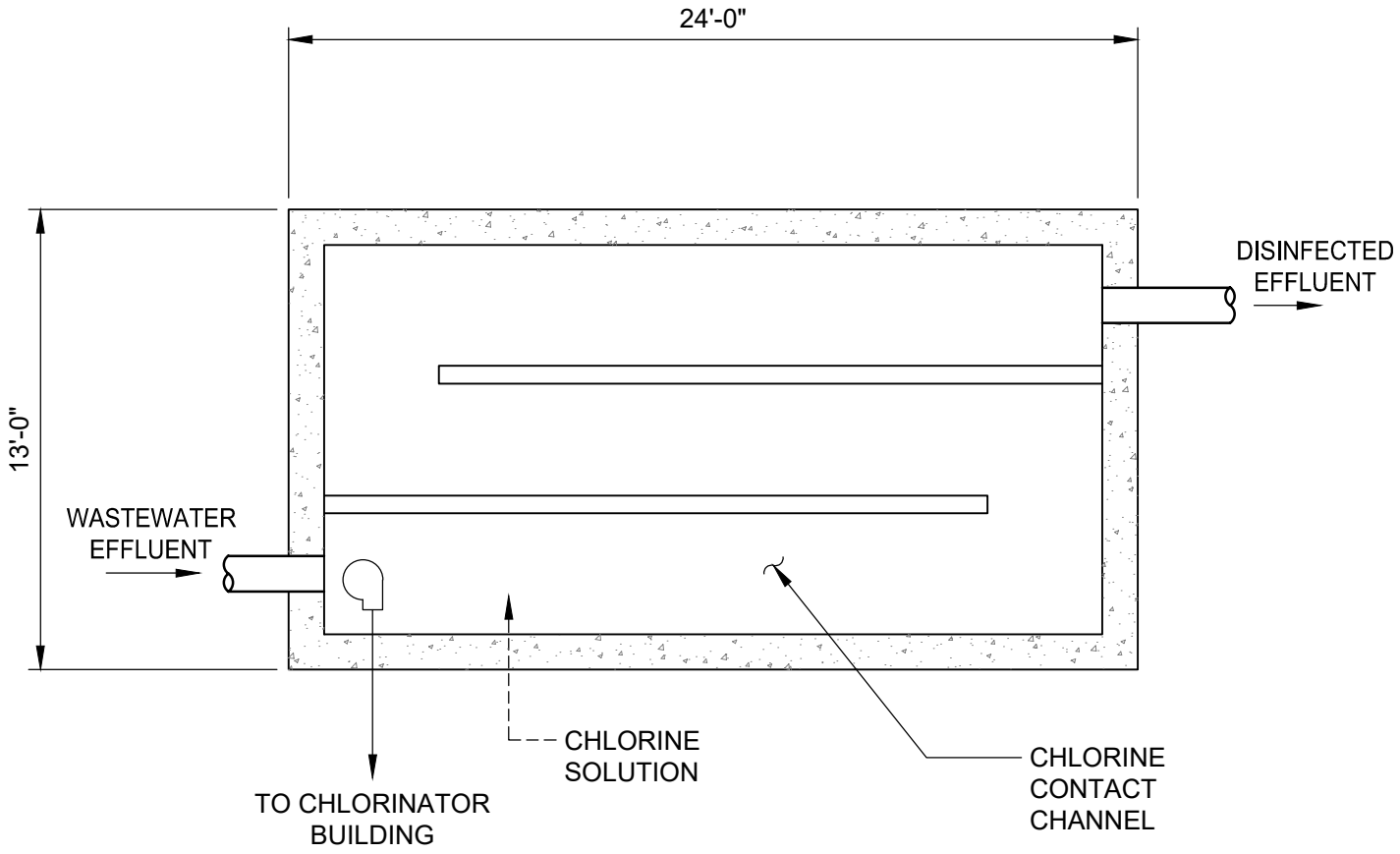
Table 4 4. Chlorine Demand

Description	Flow	Chlorine Demand
Average dry weather flow	0.19 mgd	16 lbs./day
Peak day wet weather flow	0.662 mgd	55 lbs./day

The recommended minimum contact time for chlorination is 15 minutes (Ten States Standards Wastewater, Recommended Standards for Wastewater Facilities, 1997, Great Lakes – Upper Mississippi River Board of State and Provincial Public health and Environmental Managers). The size of the chlorine contact tank will need to accommodate a 15-minute contact time for the peak discharge rate. For this application, the peak discharge rate will be equal to the peak day wet weather flow, due to the flow equalization provided by the aerated lagoons. Table 4-5 summarizes the contact tank dimensions, while Figure 4-10 shows a conceptual contact tank configuration.

Table 4 5. Chlorine Contact Tank

Description	Value
Peak discharge rate	460 gpm
Minimum chlorine contact tank	15 minutes
Tank volume required	920 cubic feet
Channel water depth	5 feet
Channel width	3 feet
Tank channel total length	61 feet
Tank dimensions including channel walls	13 feet x 24 feet



Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-ChlorContactTank Plot Date: March 22, 2018 4:32 PM Cadd User: Richard Sellona

Brown AND Caldwell	SCALE: Field JOB NUMBER: 150440	PAHALA WASTEWATER TREATMENT PLANT CHLORINE CONTACT TANK CONFIGURATION	FIGURE 4-10

4.4.2 Ultraviolet Light (UV) Disinfection

A common alternative to a chlorine disinfection is ultraviolet light (UV). Ultraviolet systems destroy microorganisms by affecting their deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) and impeding their ability to reproduce. A UV disinfection system is comprised of lamps, a reactor, and control panel. Wastewater can flow either parallel or perpendicular to the lamps in the reactor, while the control box provides a starting voltage and maintains the continuous current needed. Currently, most systems are equipped with an automated lamp cleaning system, to maintain lamp efficiency levels.

A UV system's effectiveness is dependent on the characteristics of the wastewater, the dose, and the exposure time. In the case of UV radiation, the most important factor is the transmittance of the water, which has a direct effect on the ability of UV light to penetrate through the liquid and reach microorganisms present at the required intensity. Ideally, the discharge undergoing treatment should not have a transmittance lower than 55 percent, with the intensity decreasing the farther the microorganisms are from the lamp. The optimum wavelength to effectively inactivate microorganisms is between 250 and 270 nanometer.

The main types of UV lamps used for wastewater disinfection are conventional low-pressure lamps, low pressure high output (LPHO) lamps and medium pressure lamps. Several UV systems include lamps with automated sleeve cleaning.

4.4.3 UV System Design Summary

A UV disinfection system requires a about the same size footprint as chlorine. Disinfection occurs as the organism is exposed to the UV radiation as the water flows past the UV lightbulbs. The Trojan UV3000+ system is used at numerous facilities across the US, including some treatment plants in Hawaii. The estimated cost included in this report are based on an assumed UV transmittance of 65 percent. The amalgam lamp used with the UV3000+ system has an end-of-lamp-life factor (ELLF) of 0.98 indicating little loss in UV light output over the life of the lamp. This ELLF has been tested and approved by the State of California and is also accepted by the State of Hawaii for reuse applications. The system would use LPHO lamps with automatic sleeve cleaning. LPHO lamps are energy efficient and the UV300+ system is furnished with automatic sleeve cleaning devices to reduce labor requirements. Each UV lamp is enclosed in a quartz sleeve to separate it from the water medium. Each lamp draws 254 watts at full output and is driven by electronic ballast. The electronic ballast allows the lamps to be dimmed to conserve power based on a control signal from a flow meter. The LPHO lamps will have a minimum life of 12,000 hours when operated in an automatic mode and limited to a maximum of 4 on/off cycles per 24 hours. Table 4-6 summarizes the size and design criteria for the UV system required to treat the WWTP discharge.

Table 4 6. UV Disinfection Design Summary

Description	Value
Peak Hour Wet Weather Discharge	630 gpm
Minimum UV transmittance	65 percent
No. of UV channels	1
Design dose	35,000 µWs/cm2
Disinfection limit	30 e-coli per 100mL
Validation factors	0.98 end of lamp factor

4.4.4 Cost Evaluation

A summary of capital and life-cycle estimated costs for both chlorination and UV disinfection is presented in Table 4-7 for comparison.

The capital costs include the materials and equipment costs, construction costs, electrical, instrumentation and control, soft costs, and contingency. As shown in the table, the UV option incurs higher capital costs. The life cycle costs look at the impact of the capital costs along with the annual operations and maintenance costs, including power, materials, chemicals, and labor costs over the next 30 years. The life-cycle costs for chlorination option appear to be about 78 percent of the UV option.

Table 4 7. Estimated Disinfection Costs

Description	Chlorination	UV System
Capital Cost	$200,000	$800,000
Annual Operations and Maintenance	$15,000	$6,000
Life-cycle Cost (30-Year Net Present Value)	$746,000	$947,000

4.4.4.1 Non-Economic Evaluation

Table 4-8 presents a summary of advantages and disadvantages of using an ultraviolet light for disinfection.

Table 4 8. Ultraviolet Disinfection Advantages and Disadvantages

Advantages	Disadvantages
Effective at inactivating most viruses, spores, and cysts	Low dosage may not be effective on some pathogens and some organisms can repair and reverse the destructive effects of UV
It's a physical process, instead of chemical – it eliminated the need to transport, handle, store toxic or corrosive chemicals	Turbidity and TSS in the wastewater can reduce UV disinfection effectiveness
No harmful residual compounds created that are toxic to humans or aquatic life	Will likely require more call-outs by operators due to alarms caused by "dirty power".
Shorter contact time (less than a minute)	The relative intensity of equipment maintenance requirements, including staffing training and on-island avaliablity.

4.4.5 Disinfection Recommendation

A tablet chlorination system is the recommended disinfection option over the UV system for the WWTP because it incurs lower capital and lifecycle costs. In addition, tablet chlorination will be more-reliable than UV due to frequent "dirty power" conditions on the island.

4.5 Effluent Management

For effluent management, a slow-rate land application system is proposed. The concept is to intermittently apply wastewater to crops growing in permeable soils. As the applied water percolates through the soil matrix or is taken up by the crop, it is treated by physical filtration and by biological

mechanisms. After an application period or wetting period, the surface can dry and oxygen can enter the soil matrix, which aids aerobic biological treatment. The frequent wetting and drying also maintains the infiltration rate through the soil surface and minimizes soil clogging. This method of land application is an effective treatment process for BOD_5, TSS, trace organics, phosphorus, metals and pathogen removal. Furthermore, removal of nitrogen can be significant when system is managed for that objective.

4.5.1 Design

The slow-rate system site consists of a net area of approximately 5.5 acres. The 5.5 acres will be divided into 4 small groves of native trees, so that water application will be rotated to a different grove each day. An additional small grove will be utilized as an emergency (overflow) or reserve when surface or distribution system maintenance is conducted. By using one groove per day the wet/dry cycle will be 1-day wetting and 3-days drying.

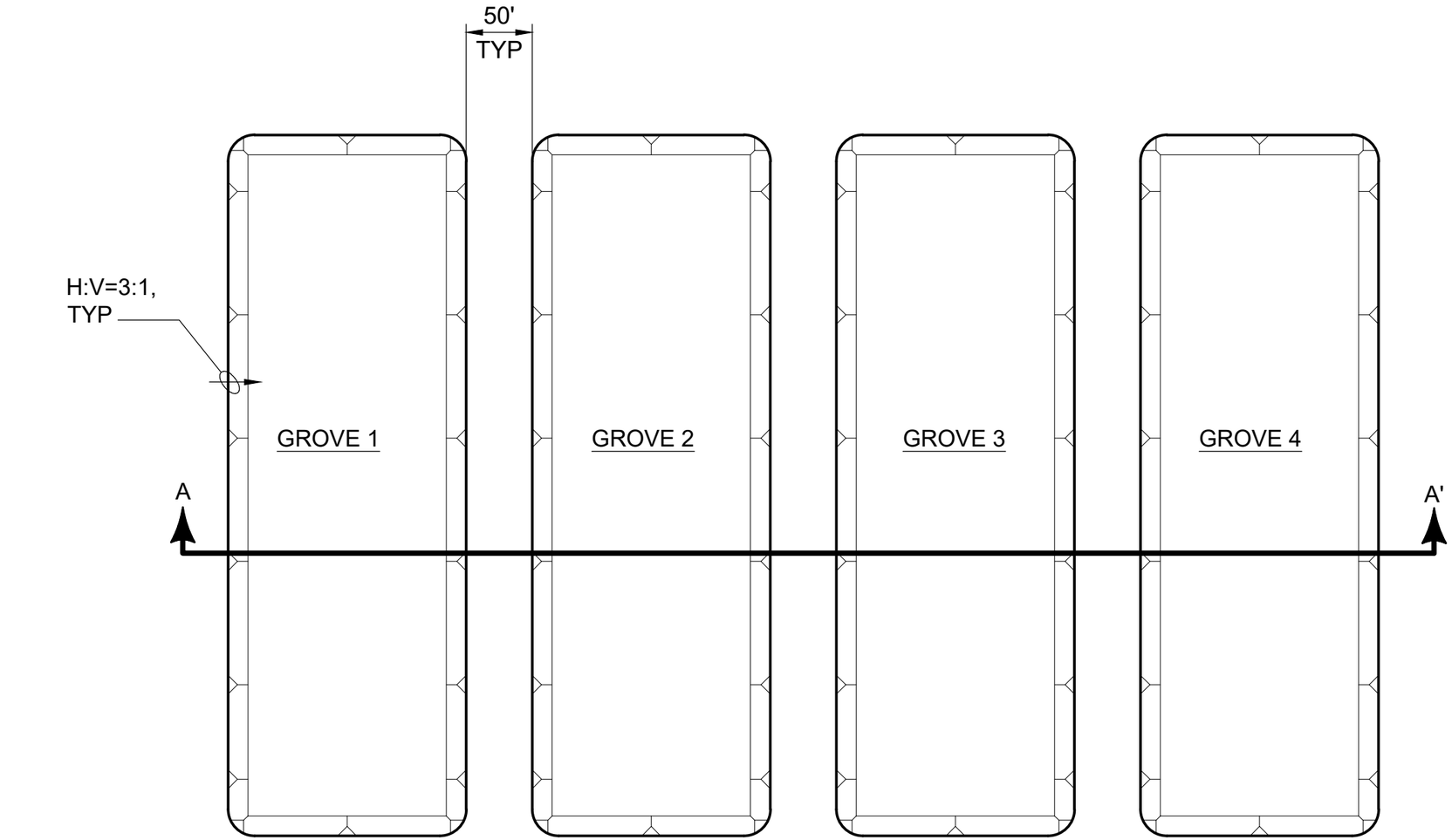
The groves will be planted with native Hawaiian trees. Trees grown within the land application area will need to be water tolerant. Table 4-9 lists potential native tree species.

Table 4 9. Potential Land Application System Tree Species

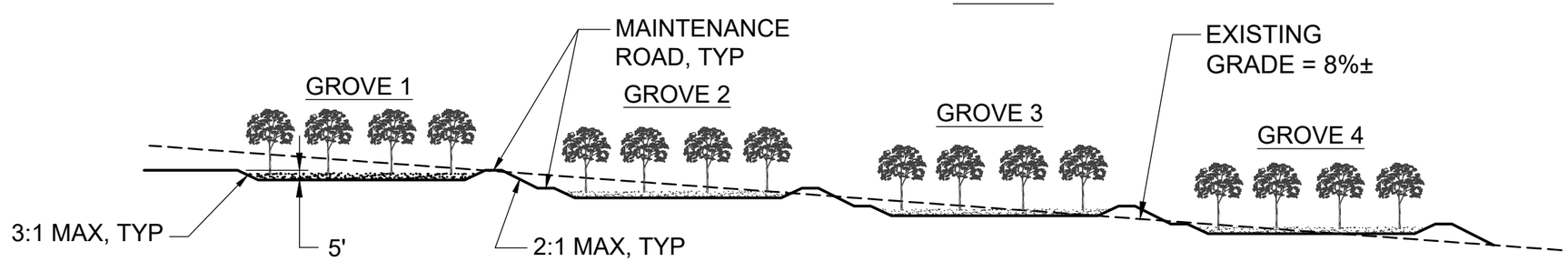
Common Name	Genus Species	Salt Tolerance	Water Requirements	Rubbish and Maintenance	Preferred Elevation
Milo	Thespesia populnea	Very	Dry to Wet	Moderate	Low to Medium
Loulu	Pritchardia hillebrandii	Very	Dry to Wet	Low	Low
Aalii	Dodonaea viscosa	Very	Dry to Medium	Low	Low to High
Kou	Cordia subcordata	Very	Dry to Wet	Moderate	Low
Golden Loulu	Pritchardia arecina	Moderate	Dry to Wet	Low	Low to Medium
Wiliwili	Erythrina sandwicensis	Moderate	Dry to Medium	Moderate	Low

The distribution system will consist of gated piping located on the surface. The piping will have slots to allow the applied wastewater to uniformly be distributed over the grove surface. A perimeter fence will be installed to limit access. Access roads will surround each grove. Figure 4-11 reflects the proposed land application schematic.

This page intentionally left blank.



PLAN



SECTION A - A'

0 100 200
SCALE IN FEET

Brown AND Caldwell

SCALE: 1" = 100'
JOB NO: 150440

PAHALA WASTEWATER TREATMENT PLANT

LAND APPLICATION SYSTEM SCHEMATIC

FIGURE
4-11

Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-LandAppSystem Plot Date: May 22, 2018 5:25 PM Cadd User: Richard Sellona

4.6 Ancillary Systems

4.6.1 Water

Potable water is not currently available at the site. The nearest potable water system is located uphill in town. Table 4-10 provides an initial assessment of the potential water demands at the WWTP. The water demands are either for process or potable uses. As shown in the table, the process water demands are significantly greater than the potable demands.

Table 4 10. Potential Water Demands

Description	Flow Rate	Type	Priority
Screenings washer	20 gpm for 10 min/hour 4,800 gpd	Process	Mandatory with screen
Hose bibs	10 gpm for 20 min/day 200 gpd	Process	Desirable to maintain facility
Emergency eye wash / shower	20 gal per use	Potable	Mandatory
Restroom	20 gpd	Potable	Recommended

To supply water to the WWTP, it is recommended to construct approximately 2,000 linear feet of pipe from the intersection of Huapala Street and Maile Street to the site and install a 1-inch water meter with 1 ½-inch backflow preventer.

A plant water system will be supplied by the County water meter. The on-site water system will be split into two branches, one for process water and one for potable water. The potable water will service the restroom and emergency eye wash/shower. A second backflow preventer will separate the process water uses from the potable connections.

4.6.2 Access Road

All weather access will be required to operate and maintain the WWTP. Access to the site will be provided by connection to Maile Street. A paved driveway apron is proposed at Maile Street and an all-weather driveway will extend into the site and provide access to and around the various WWTP infrastructure. Additionally, a turn-around area large enough to accommodate a fire truck will be provided.

Access road pavement options include aggregate base (AB) gravel, asphalt concrete (AC), or concrete. AB is the lowest cost option, but requires the most maintenance. AC pavement is not recommended for steep (greater than 12 percent) grades. Concrete is the highest cost option, but is the most durable and requires the least maintenance.

The recommended driveway pavement section is 2-inches of AC over 6-inches of aggregate base course. For portions of the driveway that exceed 12 percent slope, a concrete pavement section is recommended.

4.6.3 Stormwater Management

The overall goal of stormwater management is to mitigate the adverse impact of new construction on the environment. Stormwater management can generally be separated into two areas:

1. Stormwater Quantity: management of the quantity to prevent increased flows and volumes leaving the site on the downstream watercourses.
2. Stormwater Quality: management of the quality of stormwater runoff to prevent contaminants such as silt, trash, hydrocarbons, heavy metals, and pesticides from leaving the site through stormwater runoff.

4.6.4 Pre-development Stormwater Conditions

4.6.4.1 On-site

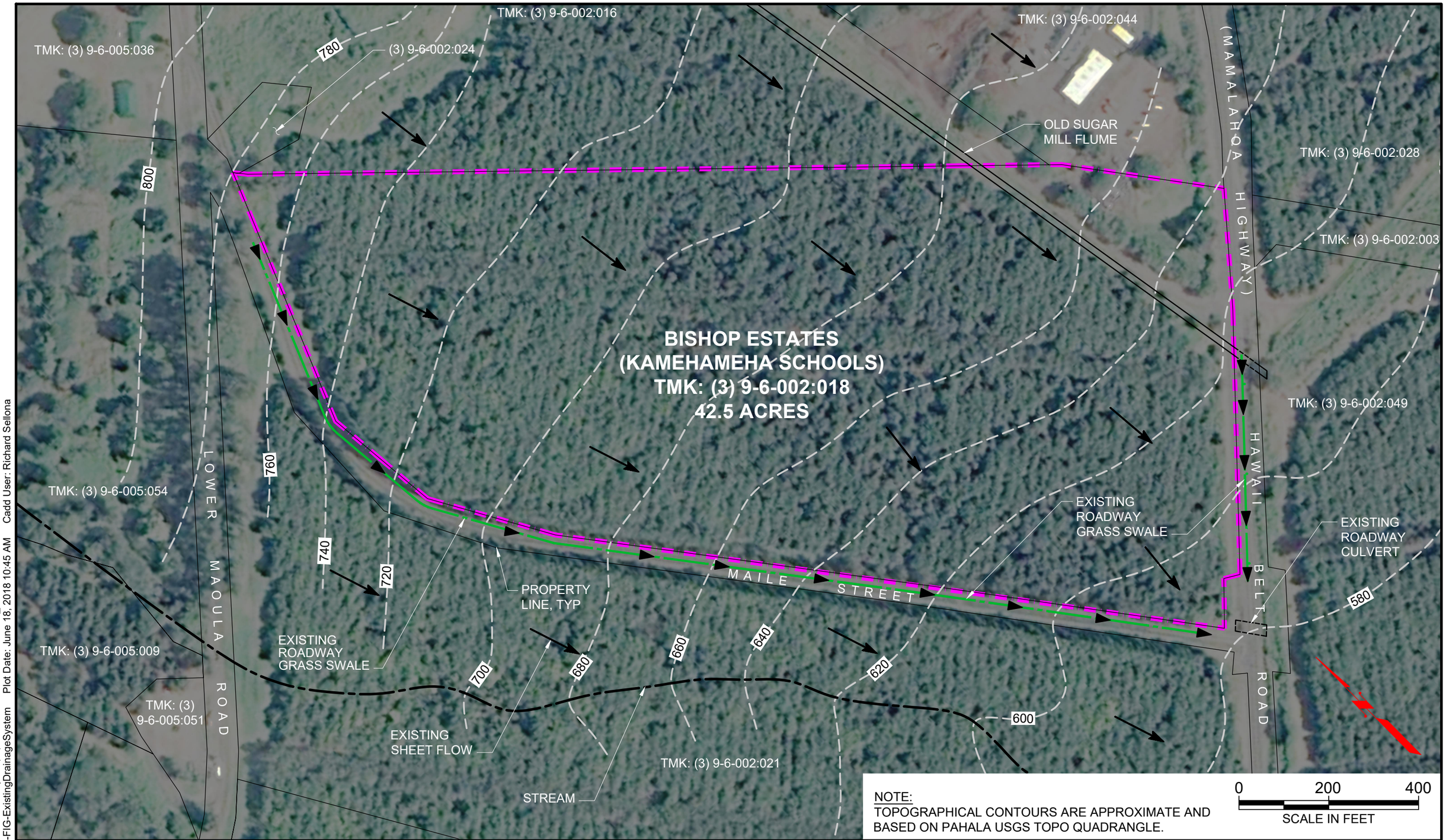
The majority of the proposed 42.5-acre site is currently utilized as macadamia nut orchards, consisting of trees or unimproved agricultural roads. The parcel is bound on two sides by improved county and state right-of-way and to the east by additional macadamia nut orchards.

The existing elevations range between 580 to 780 feet above mean sea level (MSL) and slopes in the southerly direction at an average rate of 8 percent. The soils in this area are described as Naalehu medial silty clay loam (NaC) by the Soils Conservation Service (SCS). These soils are considered well drained with low runoff and slight erosion hazard.

On-site stormwater run-off generally sheet flows in a southerly direction to off-site swales along the roadway frontages, Maile Street and Hawaiian Belt Road (also known as Mamalahoa Highway). There is no known on-site drainage collection system, see Figure 4-12.

4.6.4.2 Off-site

Swales that run and collect along the roadway frontages of the property are conveyed through a box culvert at the intersection of Maile Street and Hawaiian Belt Road and discharged makai. Similarly, running along the north property line is an abandoned concrete flume, which was previously utilized to discharge process water from the adjacent old sugar mill to agricultural land makai of Hawaiian Belt Road. Figure 4-12 conceptualizes the existing drainage system.



Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-ExistingDrainageSystem Plot Date: June 18, 2018 10:45 AM Cadd User: Richard Sellona

Brown AND Caldwell

SCALE: 1" = 200'

JOB NO: 150440

PAHALA WASTEWATER TREATMENT PLANT

EXISTING DRAINAGE SYSTEM

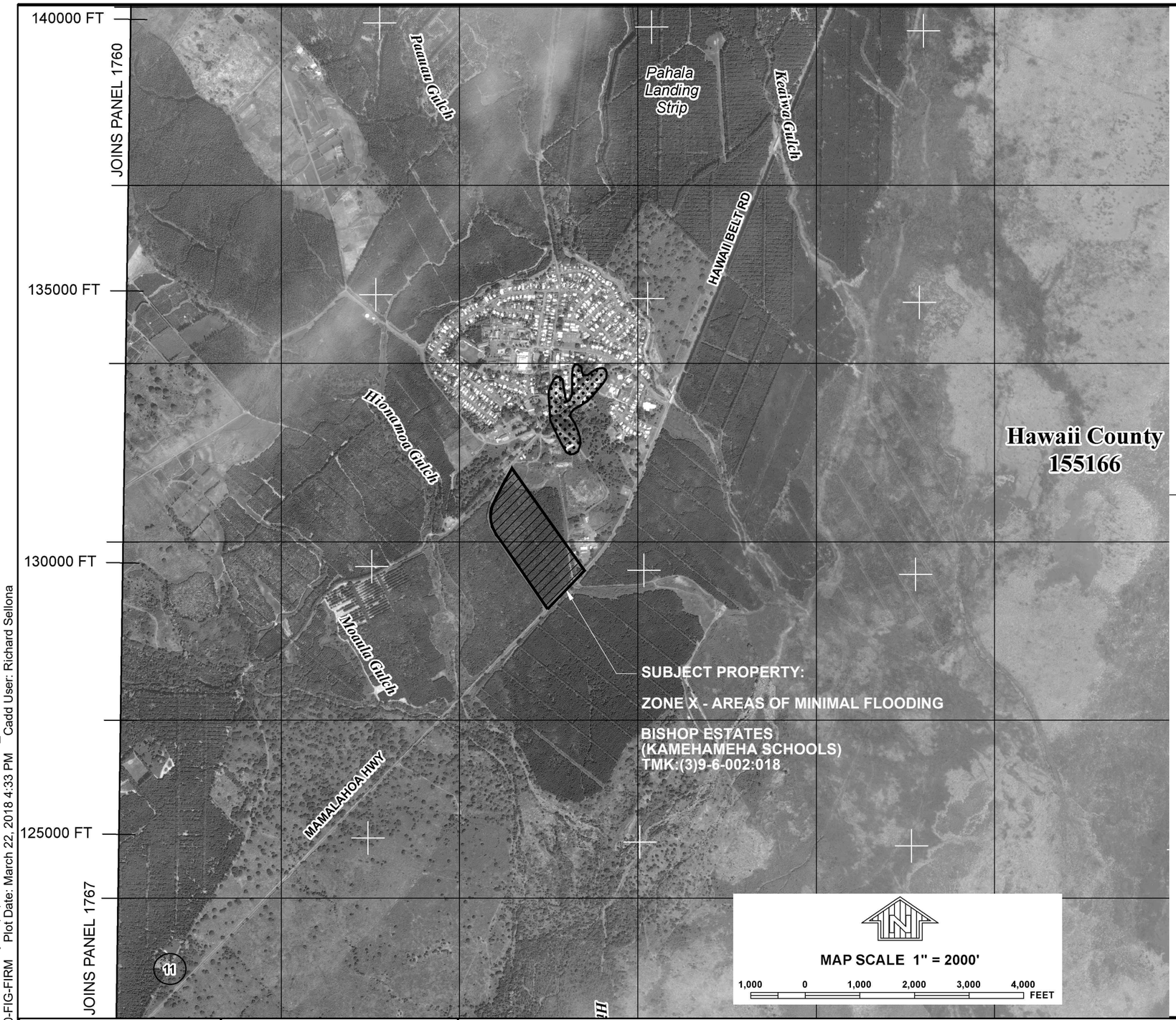
FIGURE

4-12

4.6.4.3 Flood Hazards

The subject property flood zone is designated Zone X, area of minimal flood hazard corresponding to areas outside of the five-hundred-year flood plain, as indicated on the current September 29, 2017 Flood Insurance Rate Map (FIRM), Community Panel No. 1551661800F. Zone X designations are not subject to the requirements of the Standards of Floodways, Chapter 27, Section 22 of the Hawaii County Code. See Figure 4-13 for the Flood Insurance Rate Map.

This page intentionally left blank.



Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-FIRM Plot Date: March 22, 2018 4:33 PM Cadd User: Richard Sellona

Brown AND Caldwell

SCALE: 1"=2,000'

JOB NO: 150440

PAHALA WASTEWATER TREATMENT PLANT

FLOOD INSURANCE RATE MAP

FIGURE

4-13

4.6.4.4 Stormwater Quantity

The increase in peak flow and runoff volume is a function of the increase in impervious areas associated with the proposed improvements.

All exposed (not enclosed) treatment processes will be sized to include free-board depth to accommodate the 24-hour, 100-year storm event. Thus, no stormwater runoff from these areas is anticipated.

A drainage system will be designed to address stormwater surface run-off caused by impervious portions of the WWTP development. Per the Hawaii County Code, Chapter 27, Section 20, the site drainage plan shall accommodate the run-off caused by the proposed development, within the site boundaries, for a one-hour, ten-year storm event. The pre-development runoff (10-year, 1-hour storm) is approximately 23 cubic feet per second (cfs). The post-development runoff is approximated at 24.5 cfs, which is a net increase of 1.5 cfs.

To ensure that there is no adverse impact on adjacent or downstream properties due to post-development flows, an on-site drainage system will collect runoff via grated inlets or swales. These flows will be conveyed to on-site drainage detention systems, such as subsurface linear infiltration or depressed detention basins, to detain flows and volumes to their pre-development condition. Furthermore, landscape buffers with dirt berms will be constructed around most of the perimeter of the property acting as secondary containment in the event of a large storm event.

A complete analysis of the pre and post development drainage condition will be completed during the design phase.

4.6.4.5 Stormwater Quality

The quality of stormwater leaving the site is also a concern. Stormwater quality degrades with development and increased impervious surfaces, because various pollutants are introduced into the stormwater runoff.

The first half-inch of runoff during a storm is referred to as the Water Quality Volume (WQV) or the "first-flush" volume. This portion of the runoff from a storm contains measurably more suspended solids plus other contaminants per cubic foot than would be expected in runoff occurring later in the storm.

To mitigate the quality of runoff, the drainage system will incorporate permanent Best Management Practices (BMP's). Recommended permanent BMP include scheduled good-housekeeping, which will reduce litter and other constituents from being washed into the storm drain system, and detention basins and underground infiltration facilities that prevent the release of sediment and other pollutants to downstream waterways or adjacent properties. A full assessment of all available BMP's to optimize water quality will be provided during design of the project.

4.6.5 Electrical Systems

It will be necessary to bring electrical power to the WWTP site. It is anticipated that Hawaii Electric Light Company (HELCO) will bring overhead power lines to the site and supply 480-volt, 3 phase power to the WWTP via a pole-mounted transformer to a service panel with a meter.

The floating surface aerators will consume the majority of the electricity supplied to the site. An electrical room will house the electrical gear, plant control equipment and the chlorination system. Exterior lighting at the site will be limited to manually switched lights at the entrance to the electrical building and at the headworks area.

A standby power system will be provided in the form of a pad-mounted diesel generator and above-ground fuel tank with capacity to support three consecutive days of operation. In addition, the

electrical service panel will be equipped with a manual transfer switch and generator receptacle to allow connection of a trailer-mounted generator in the event of emergency generator failure during an extended power outage.

4.6.6 Telemetry Systems

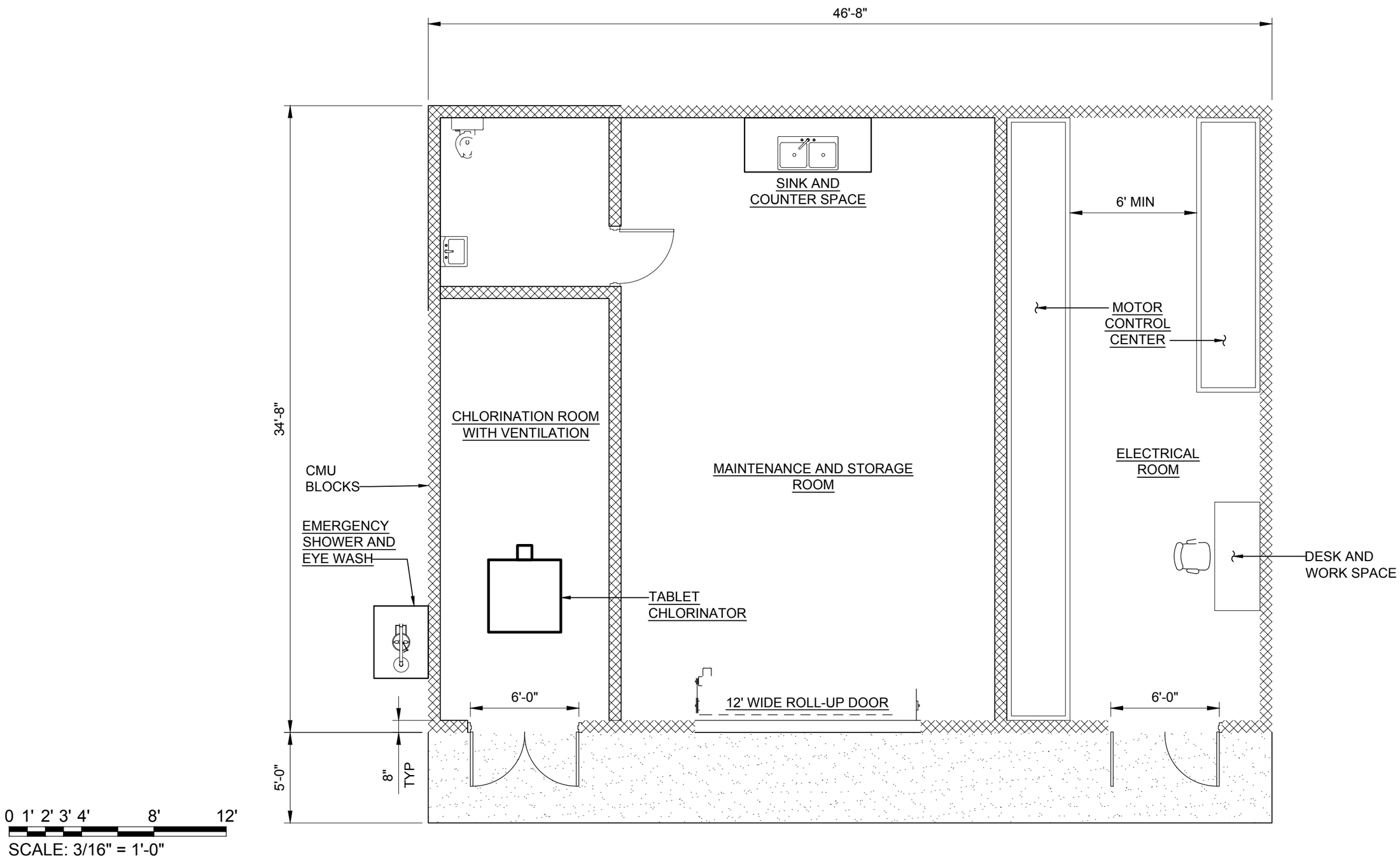
A land-line telephone telemetry system with auto-dialer will be provided to provide Hilo-based operation staff of alarm conditions and key operational parameters at the WWTP. Additionally, a cell phone will be available for backup.

4.6.7 Operations Building

An operations building will be constructed to include the electrical room, chlorinator room, restroom, and maintenance/storage room, as shown in Figure 4-14.

4.6.8 Site Fencing

The entire WWTP site, including the treatment systems and the land application system, will be fenced (6-foot high chain link) and posted to prevent public access.



Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-OpBldg Plot Date: June 12, 2018 2:56 PM Cadd User: Richard Sellona

Brown AND Caldwell

SCALE: 3/16" = 1'-0"

JOB NO: 150440

PAHALA WASTEWATER TREATMENT PLANT

OPERATIONS BUILDING PRELIMINARY FLOOR PLAN

FIGURE

4-14

Section 5

Preliminary Design of Improvements

The following is a summary of the preliminary design for the proposed Pahala WWTP.

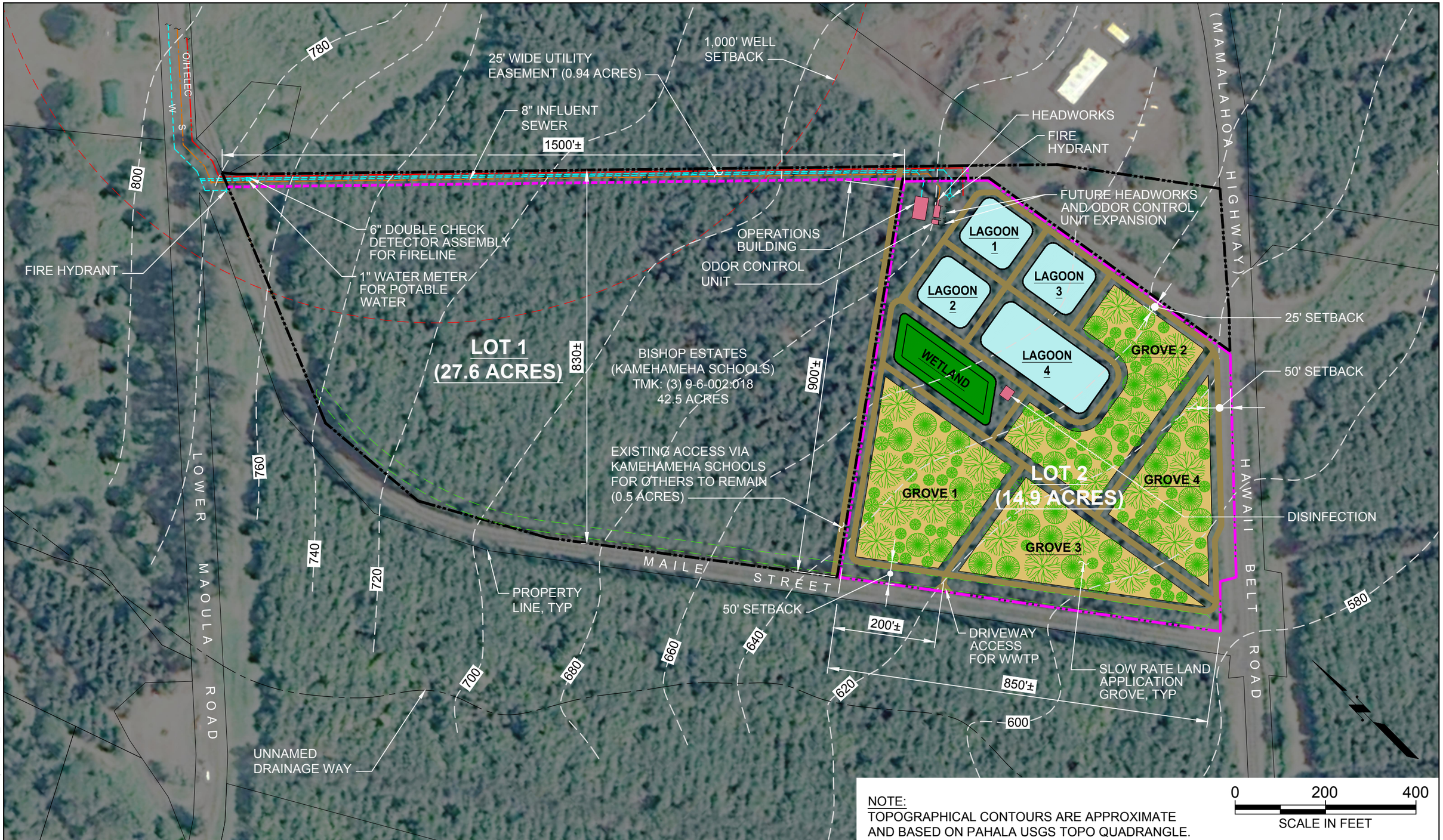
5.1 Site Plan

The existing parcel is an active macadamia nut tree orchard. The prevailing grade is in the north to south direction at 5 to 10 percent slope. Approximately 14.9 acres of the land will be cleared for the construction of the proposed facility. Figure 5-1 presents a preliminary site plan for the WWTP.

5.2 Process Schematic

Figure 5-2 presents the recommended facilities process schematic.

This page intentionally left blank.



NOTE:
TOPOGRAPHICAL CONTOURS ARE APPROXIMATE AND BASED ON PAHALA USGS TOPO QUADRANGLE.

Brown AND Caldwell

SCALE: 1" = 200'

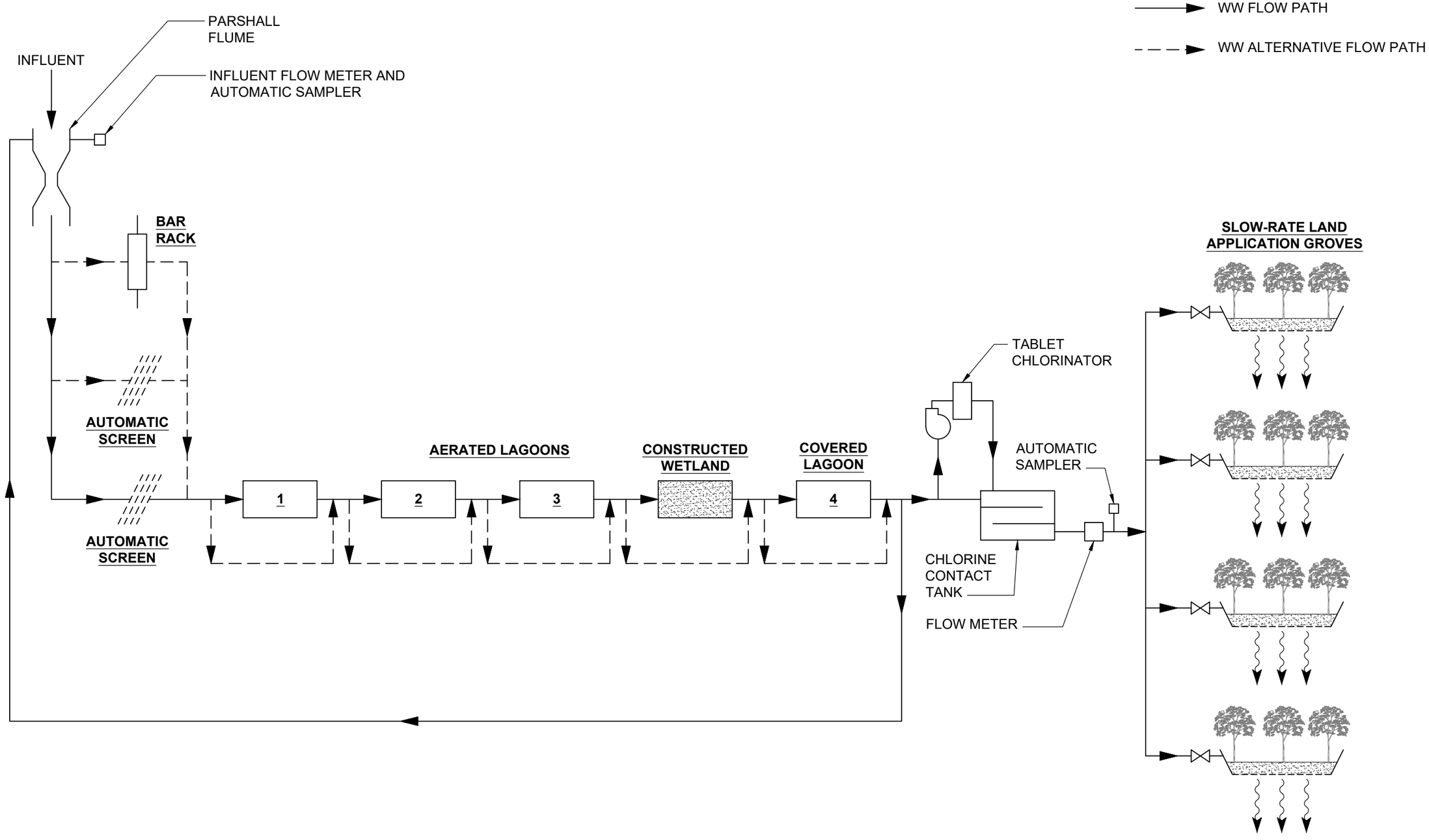
JOB NO: 150440

PAHALA WASTEWATER TREATMENT PLANT

PRELIMINARY SITE PLAN

FIGURE 5-1

Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-PreliminarySitePlan_WithAerial_14.9acre_FullBuildAlternative Plot Date: June 18, 2018 1:46 PM Cadd User: Richard Sellona



Brown AND Caldwell

SCALE: NONE

JOB NO: 150440

PAHALA WASTEWATER TREATMENT PLANT

RECOMMENDED FACILITIES PROCESS SCHEMATIC

FIGURE 5-2

Path: P:\Projects\Hawaii, County Of (HI)\150440 COH Pahala WWTP_CAD\0-PROJECT\FIGURES
File Name: 150440-FIG-LandAppPSys_Schem Plot Date: May 22, 2018 5:26 PM Cadd User: Richard Sellona

5.3 Design Criteria

Table 5-1 provides preliminary design criteria.

Table 5 1. Preliminary Design Criteria

Description	Value
Influent flows:	
• Average dry weather	190,000 gpd
• Peak day wet weather	662,000 gpd
• Peak hour wet weather	630 gpm
Influent characteristics	
• BOD_5	300 mg/L
• TSS	300 mg/L
Odor control – granular activated carbon	
• Airflow rate	500 cfm
• H_2S Inlet concentration	1-10 ppm
• H_2S removal efficiency	99%
• Media type	High-capacity carbon
• Vessel diameter	3 feet
• Vessel height	6 feet
• Minimum carbon quantity	570 lbs
• Minimum bed depth	3 feet
• Fan motor	2 hp
• Nominal inlet size	8 inches
Mechanical screens	
• Number of units	2
• Type	In-channel cylindrical
• Screen opening size	0.25 inch (6 mm)
• Maximum flow rate capacity	Greater than 625 gpm each
• Screening washing	Integral
• Screening compaction	Integral
• Screening wash water flow	20 gpm
• Screening wash water pressure	50 psi
Bypass screen	
• Type	Manually-cleaned bar rack
• Bar spacing	1 inch
• Rake	Interlocking with bars
Screenings receptacle	

Table 5 1. Preliminary Design Criteria continued	
• Type	55-gallon drum or bags
• Screenings volume per million gallons treated	5 ft^3/Mgal
• Estimated screenings quantity	1 ft^3/day
• Disposal frequency	1/week
Influent flow metering	
• Type	Parshall flume
• Maximum flow capacity	Greater than 630 gpm
• Minimum straight upstream channel section	20 times the throat width
Influent flow sampling	Refrigerated automatic composite sampler
Lagoon cells	
• Number of cells	4
• Maximum lagoon temperature	25°C
• Minimum lagoon temperature	20°C
• Freeboard	3 feet
• Working water depth	15 feet
• Allowance for sludge	3 feet
• Total water depth	18 feet
• Side slope	3(H) : 1(V)
• Working volume of lagoon 1 to 3	0.80 Mgal
• Working volume of lagoon 4	1.60 Mgal
Aerators	
• Type	Floating mechanical surface aerators
• Cell 1 aerators	30 hp (2 at 15 hp)
• Cell 2 aerator	15 hp
• Cell 3 aerator	10 hp
• Cell 4 aerator	5 hp aspirator style, floating ball cover for algae control
Constructed Wetland	
• Water temperature	25 degrees C
• Aerated lagoon effluent nitrate-N concentration	19 mg/l
• Aerated lagoon effluent ammonia-N concentration	1 mg/l
• Constructed wetland effluent total N concentration	15.3 mg/l
• Total constructed wetland surface area	0.25 acres
• Flow path length	50 feet
• Hydraulic application width	200 feet
• Media depth	24 inches
• Media type	Medium gravel, D_{10} = ¾ inch

Table 5 1. Preliminary Design Criteria continued	
• Media porosity	38 percent
• Percolation prevention system	60 mil high density polyethylene (HDPE) liner
• Vegetation	Native Hawaiian reeds and/or rushes, species to be determined
Disinfection system	
• Type	Chlorine
• Form	Calcium hypochlorite tablets
• Design chlorine dose	10 mg/L
• Chlorine contact time	15 minutes minimum
Effluent flow metering	
• Type	Magnetic
Effluent sampler	
• Type	Refrigerated automatic composite
Effluent quality	
• BOD_5	Less than 30 mg/L monthly average Less than 60 mg/L peak
• TSS	Less than 30 mg/L monthly average Less than 60 mg/L peak
Effluent management system	
• Type	Slow-rate land application groves
• Number	4
• Minimum depth	5 feet
• Design percolation rate	0.0095 inches per minute
• Design application rate	8 percent of percolation rate
• Distribution system	Gated pipe
• Stormwater containment	100-year, 24-hour storm event
• Vegetation	Native Hawaiian trees
Stormwater site management	10-year, 1-hour storm

5.4 Environmental Benefits

A well-designed and managed land treatment system limits wastewater application to rates to minimize adverse impact to groundwater quality. The deep percolate from the SR land treatment system is expected to contain less than 1 mg/L of BOD_5 and TSS. While the State of Hawaii has not adopted formal groundwater quality standards, the drinking water standard for nitrate (10 mg/L as N) in the annual average deep percolate below the land treatment system was used as a performance target to design the land treatment site. Phosphorus adsorption is excellent in SR land treatment systems, and 99 percent or greater phosphorus removal is anticipated. Table 5-2 compares the current loads to the environment via the LCCs and the loads to the environment after the proposed project is implemented via the deep percolate from the land treatment system. Figure

5-3 provides a graphical representation of the environmental benefits of the proposed project compared to the status quo.

Table 5 2. Environmental Benefits of Proposed Project

Parameter	Current Annual Load to Environment via LCCs	Annual Load to Environment via Proposed Land Treatment System Deep Percolate	Reduction
BOD_5	174,000 lbs./year	600 lbs./year	>99%
TSS	174,000 lbs./year	600 lbs./year	>99%
Nitrogen	23,000 lbs./year	4,100 lbs./year	83%
Phosphorus	4,000 lbs./year	40 lbs./year	>99%

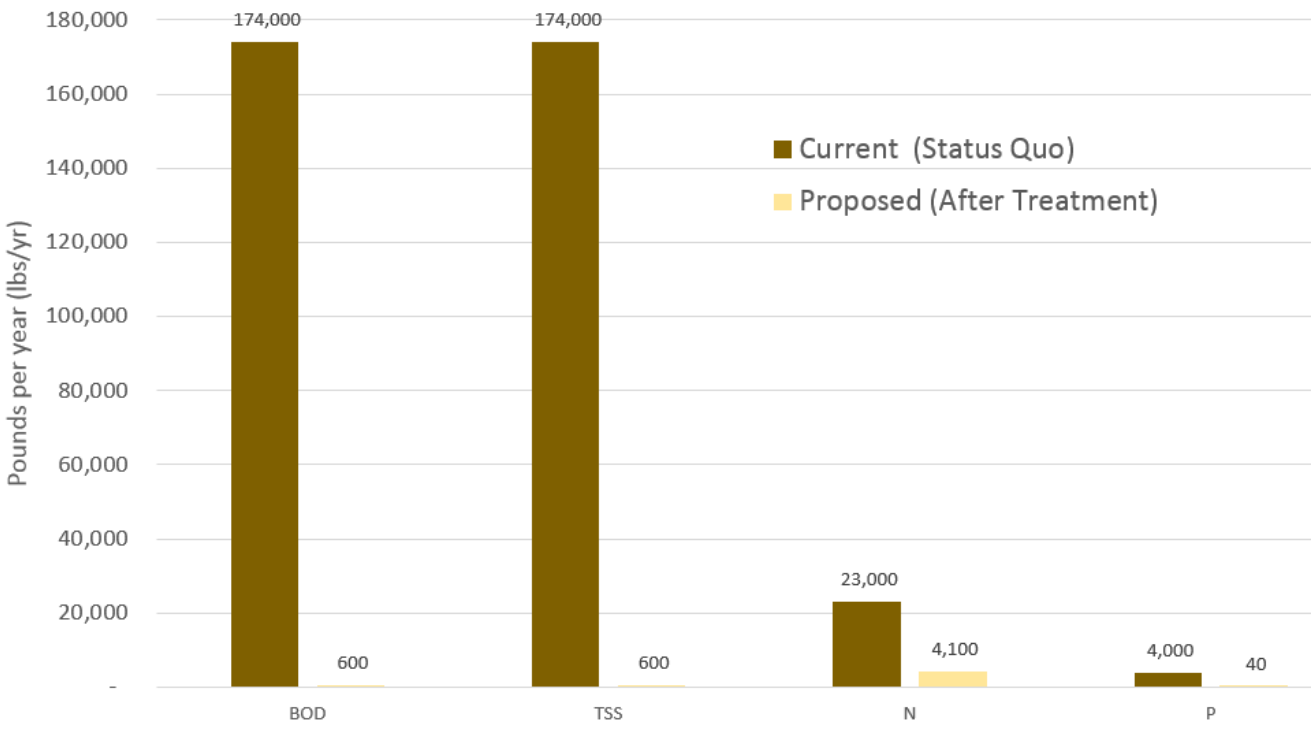


Figure 5-3. Environmental Benefits of Proposed Project

5.5 Cost Estimates

An order of magnitude probable construction is summarized in Table 5-3. The estimate includes a 25 percent estimating contingency. The detailed cost estimate is included as Appendix A.

Table 5 3. Pahala WWTP Order of Magnitude Construction Cost Estimate

Description	Estimated Construction Cost
Electrical and instrumentation	$1,976,000
Headworks	$906,000
Odor Control	$412,000
Lagoons	$2,222,000
Constructed Wetland	$611,000
Land Application	$925,000
On-site improvements	$6,325,000
Off-site improvements	$1,223,000
Total Estimated Construction Cost	$14,600,000

5.6 Future Expansion

5.6.1 Full Buildout Flows

Full buildout wastewater flow projections were developed using the Draft Ka'u Community Development Plan (March 2015) and the CCH's current (2017) wastewater standards. Table 5-4 summarizes the projected full buildout flows for the community, and Figure 2-1 shows the WWTP full buildout service area.

Table 5 4. Pahala WWTP Full Buildout Flow Projections

Description	Value	Peaking Factor
Average dry weather flow	360,000 gallons per day	1.0
Peak day wet weather flow	1,260,000 gallons per day	3.5
Peak hour wet weather flow	1,200 gallons per minute	4.8

5.6.2 Improvements

To accommodate the flow increase anticipated from the full buildout of the Pahala wastewater collection system, the WWTP will require facility upgrades. The recommended upgrades include headworks and odor control expansion within the 14.9-acre site.

Additionally, the lagoon system will require modifications. Lagoon 1 will be converted to a complete mix aerated lagoon environment to accommodate wastewater treatment needs. In a complete mix aerated lagoon, sufficient mixing energy is provided to maintain the lagoon solids in suspension always. A completely mixed aerated lagoon system performs as an activated sludge process without solids recycle. The higher mixing energy, as compared to a partial mix lagoon, creates greater

opportunity for contact between the naturally-occurring micro-organisms in the lagoon and dissolved organic matter. As a result, complete mix lagoons provide greater levels of treatment within a smaller volume than partial mix lagoons. However, facilities must be provided downstream of complete mixed lagoons to allow removal of settleable solids from the water column. To provide a place for solids settling, lagoons 2 through 4 will continue to act as partial mix aerated lagoons downstream of the complete mix lagoon 1. Lagoon 4 will require no aeration and will continue to be covered to deprive algae of sunlight and allow suspended solids to settle out of the system effluent.

Utilizing this lagoon system approach, the Pahala WWTP will require modifications at full buildout flows, but is not anticipated to expand beyond the initial build 14.9 acres.

Section 6

Implementation

Table 6-1 provides the implementation schedule for the WWTP. The LCCs will be closed following connection of the existing sewer system to the WWTP.

Table 6 1. Implementation Schedule

Description	Milestone
Complete design of WWTP	September 18, 2019
Complete construction of WWTP	May 20, 2021
Connect existing collection system to WWTP	June 30, 2021

This page intentionally left blank.

Section 7

Alternative Treatment Options Evaluation

Several other treatment alternatives were considered for the Pahala WWTP, as summarized below.

7.1 Option Descriptions

7.1.1 Option 1: Aerated Lagoons/Constructed Wetland/Land Application

Option 1 consists of an aerated lagoon treatment system with a constructed wetland and disinfection, followed by land application for effluent management, as described previously throughout this report. Figure 7-1 is a schematic diagram for Option 1.

Figure 7-1. Option 1 Schematic Diagram

7.1.2 Option 2: R-1 Treatment/Land Application

Option 2 consists of constructing a membrane bioreactor (MBR) or an activated sludge treatment process followed by cloth media filtration, followed by UV disinfection, to produce recycled water that meets DOH R-1 recycled water criteria. R-1 recycled water is effluent that has undergone oxidation, filtration, and disinfection. R-1 is considered the highest grade of recycled water and can be used for irrigation of golf courses, parks, schools, and all types of agricultural crops. The R-1 treatment system would be followed by land application as per Option 1. Figure 7-2 is a schematic diagram for Option 2.

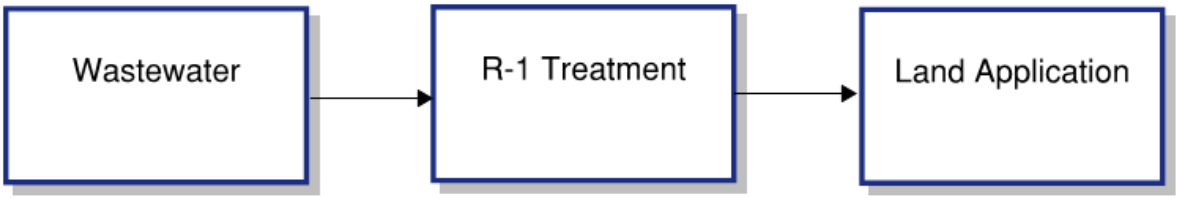


Figure 7-2. Option 2 Schematic Diagram

7.1.3 Option 3: R-1 Treatment/Seasonal Water Recycling

Option 3 consists of a treatment system similar to Option 2 to produce R-1 recycled water. The recycled water would be used to irrigate nearby macadamia nut orchards. Figure 7-3 provides a schematic diagram of Option 3.

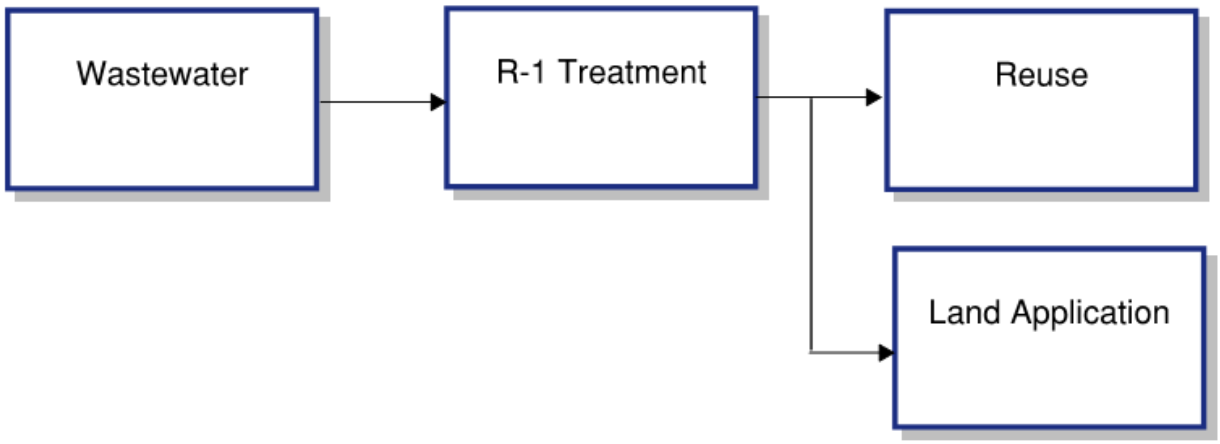


Figure 7-3. Option 3 Schematic Diagram

A water recycling analysis was prepared to assess the potential seasonal demand for recycled water produced by the WWTP. Figure 7-4 is an irrigation demand assessment for the Pahala area based on published climate data. The graph shows precipitation, estimated evapotranspiration, and the irrigation demand for each month of the year. As shown in the figure, irrigation is typically needed from April through September, reaching a peak demand in June. The graph shows that no irrigation is typically needed between October and March, because precipitation exceeds evaporation during those months.

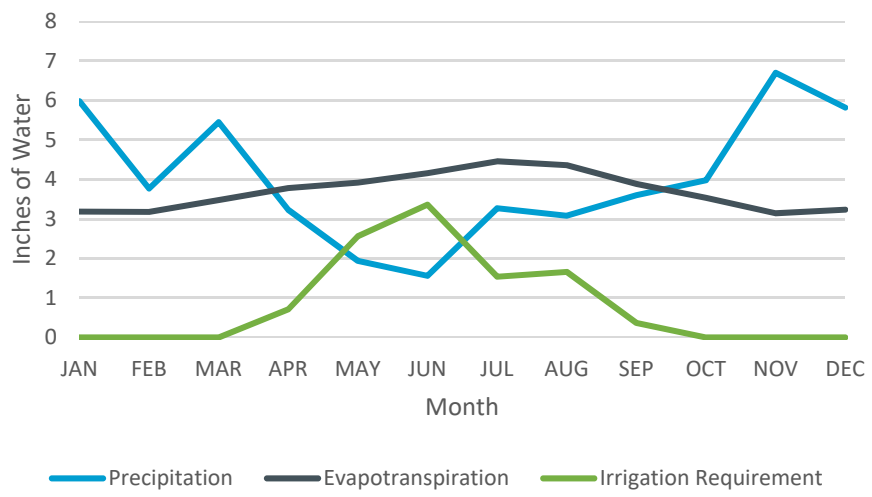


Figure 7-4. Irrigation Demand Assessment

The potential demand for recycled water produced by the Pahala WWTP was assessed, as shown in Figure 7-5. The WWTP could potentially provide irrigation water for approximately 62 acres, based on the peak month irrigation demand in June. During June, all the recycled water produced by the WWTP would be used on the 62 acres. During all other months the supply of recycled water will typically exceed the demand, and the excess water would be land applied on the WWTP property as per the previous alternatives.

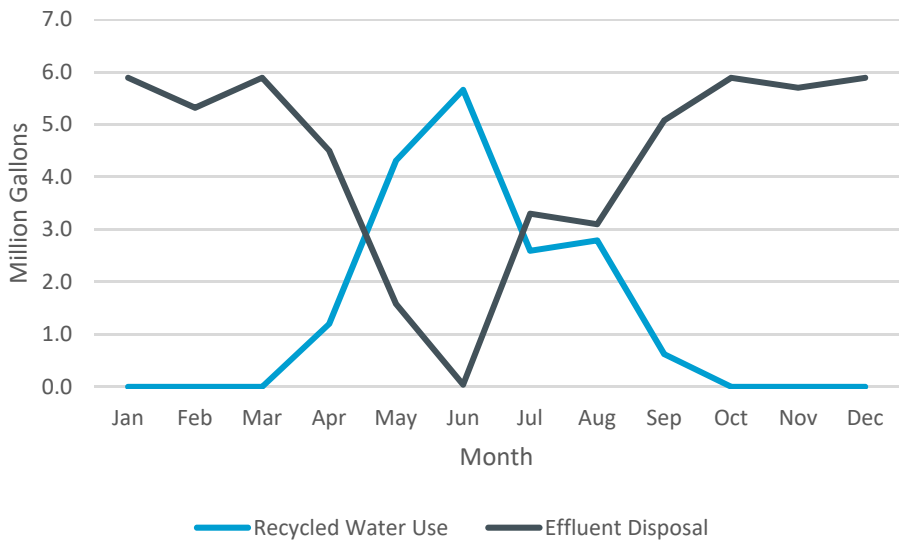


Figure 7-5. Option 3 Recycled Water Demand Assessment

The Pahala climate makes it possible to only recycle only about 25 percent of the annual flow in this scenario, due to the long wet season and relatively low evapotranspiration rate during the dry season. This is in stark contrast to the Kailua-Kona area on the leeward side of the island, where the climate will allow approximately 88 percent of the recycled water produced at the Kealakehe WWTP

throughout the year to be recycled. Figure 7-6 provides a comparison of the irrigation demand in Pahala with the irrigation demand at Kealakehe.

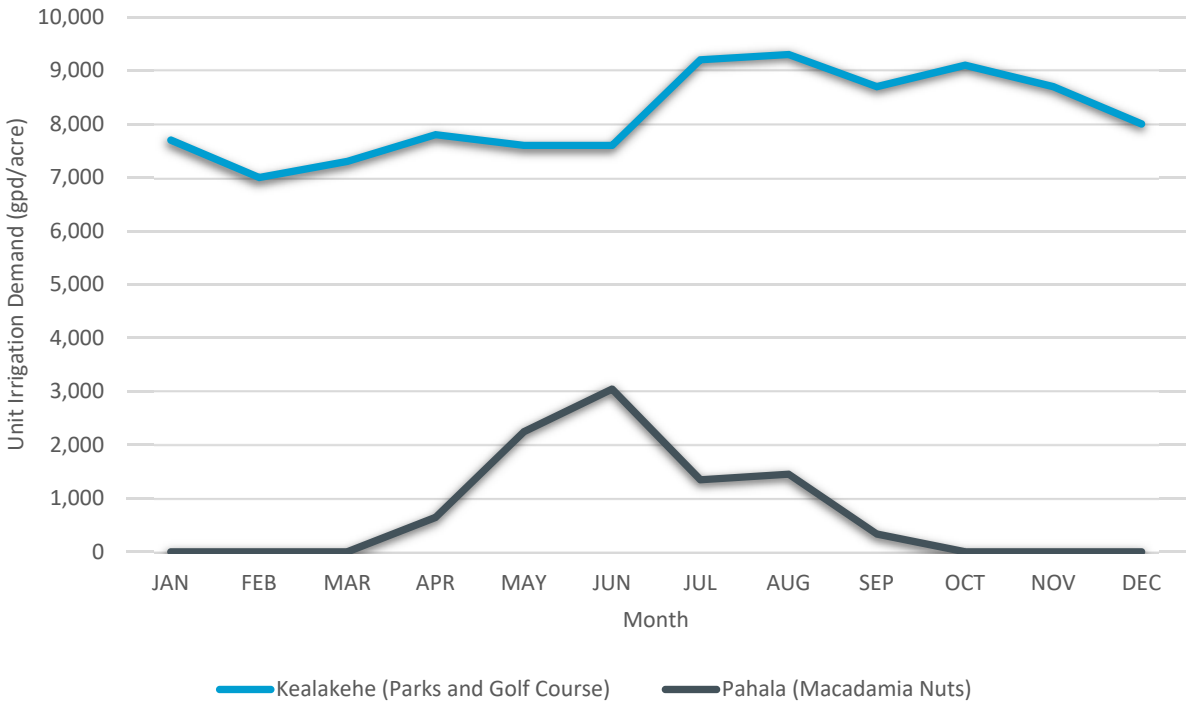


Figure 7-6. Comparison of Irrigation Demands at Pahala and Kealakehe

7.1.4 Option 4: R-1 Treatment and Storage for 100% Water Recycling

Option 4 adds a seasonal storage reservoir, as shown schematically in Figure 7-7.

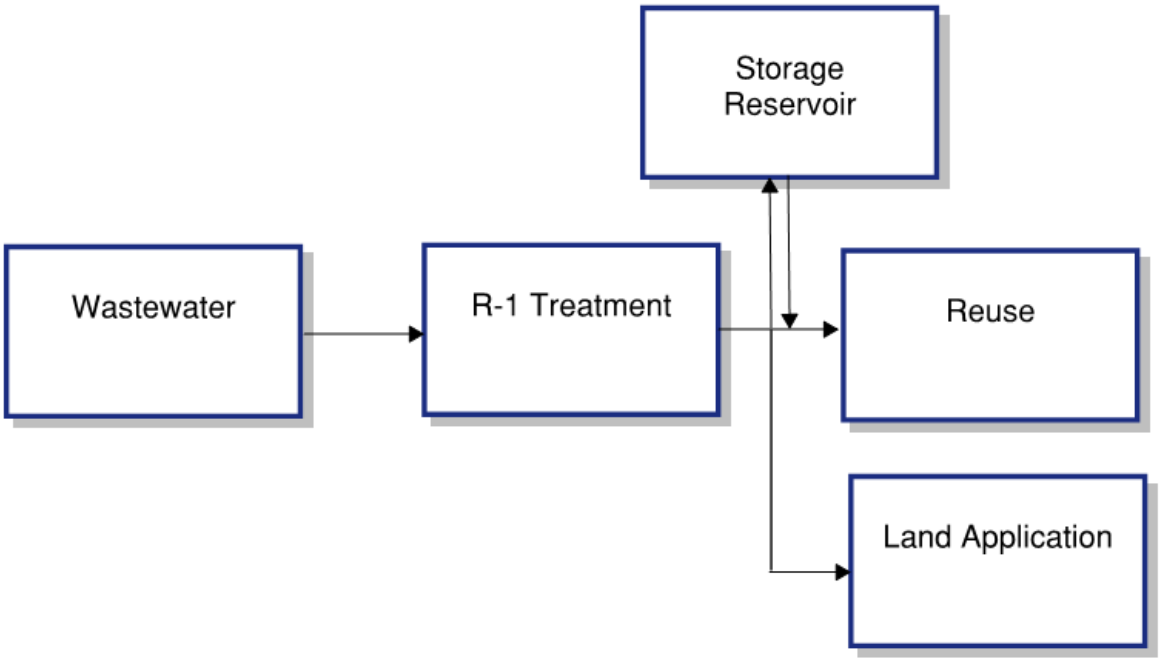


Figure 7-7. Option 4 Schematic Diagram

Implementation of a seasonal storage reservoir would make it possible to recycle 100 percent of the R-1 water produced by the Pahala WWTP in a typical year. The seasonal storage reservoir would make it possible to save recycled water produced during the wet season for use during the dry season. An annual water balance was prepared to assess the seasonal storage reservoir needs for the Pahala WWTP. Figure 7-8 provides a summary of the evaluation, and shows recycled water supply, use, and storage throughout a typical year. As shown in the graph, peak storage of approximately 40 million gallons (Mgal) would occur during April, and by August the storage reservoir would be dry and ready for another wet season. Under this scenario it would be possible to irrigate approximately 253 acres of macadamia nut trees. The lined, 20-foot-deep storage reservoir would have a water surface area of approximately 7 acres.

Storage of recycled water is not without its challenges. Recycled water contains nutrients that allow algae to grow. The algae can cause odors if stagnant water conditions are allowed to develop. Recycled water that is stored in open reservoirs must often be re-treated to improve the water quality characteristics. Recycled water reservoirs can be equipped with mixers to prevent stagnant water conditions, and/or be equipped with floating covers to block the sunlight that fosters algal growth.

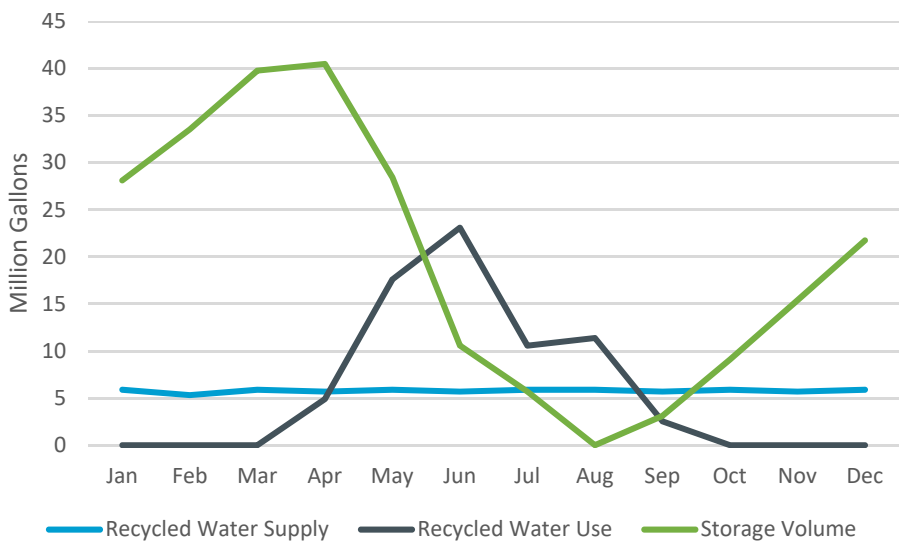


Figure 7-8. Seasonal Storage Reservoir Analysis

Implementation of a seasonal storage reservoir and recycling program would not eliminate the need for a land application system at the WWTP, as described previously. HAR 11-62 requires a disposal system for all recycled water system, to provide a means for disposal of water that does not meet R-1 standards or disposal of excess water should the seasonal storage reservoir capacity be exceeded during an exceptionally wet year.

7.1.5 Option 5: Maximum Practical Treatment

Option 5 consist of implementing advanced wastewater treatment processes that represent maximum practical treatment. The option is illustrated schematically in Figure 7-9. The process treatment train consists of a 5-stage Bardenpho activated sludge treatment process, followed by chemical addition and denitrifying filters to reliably reduce total nitrogen to less than 4 mg/L and total phosphorus to less than 0.1 mg/L. The treatment processes would be followed by a disinfection process to create R-1 recycled water. The recycled water produced would be used to irrigate macadamia nut trees as per Option 3. A seasonal storage reservoir could also be implemented at additional cost. A land application system would be required as per the previous Options.

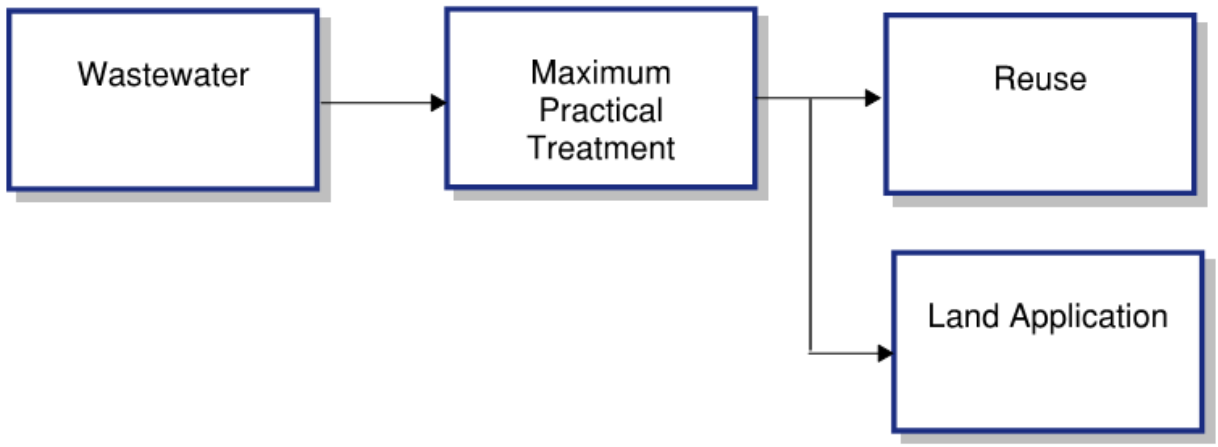


Figure 7-9. Option 5 Schematic Diagram

7.2 Cost Comparisons

Planning-level cost estimates were prepared for the five options, as described below.

7.2.1 Capital Costs

Table 7-1 summarizes the capital costs associated with the options described above. Additional detail can be found in Appendix A. The capital costs shown in the table do not include costs associated with collection system improvements or closure of the existing LCCs.

Table 7 1. Summary of Capital Cost Estimates

Option	Name	Estimated Capital Cost
1	Aerated lagoons/constructed wetland/land application	$14.6 million
2	R-1 treatment/land application	$18.4 million
3	R-1 treatment/seasonal water recycling	$20.2 million
4	R-1 treatment and storage for 100% water recycling	$30.4 million
5	Maximum practical treatment	$26.0 million

Comparison of options 1 and 2 shows that providing R-1 treatment instead of the aerated lagoon and wetland natural treatment system will increase the capital cost by approximately $3.8 million. Option 3 shows that addition of water recycling to reuse approximately 25 percent of the annual flow would add an additional $1.8 million in capital costs. Option 4 shows that constructing a seasonal storage reservoir to recycle 100 percent of the flow would add an additional $10 million in capital costs. Comparison of options 3 and 5 shows that providing maximum practical treatment instead of normal R-1 treatment would add $5.8 million in capital costs.

7.2.2 Operation and Maintenance Costs

Operation and maintenance (O&M) costs include labor, electricity, chemicals, spare parts, sludge management, and other costs required to operate and maintain the facility. Table 7-2 provides a

summary of the O&M cost estimates developed for the options. Additional details can be found in Appendix A.

Table 7 2. Summary of O&M Cost Estimates

Option	Name	Estimated Annual O&M Cost
1	Aerated lagoons/constructed wetland/land application	$236,000
2	R-1 treatment/land application	$1,052,000
3	R-1 treatment/seasonal water recycling	$1,055,000
4	R-1 treatment and storage for 100% water recycling	$1,063,000
5	Maximum practical treatment	$1,421,000

As shown in the table, option 1 incurs significantly lower O&M costs than the other options. The significant cost differential is due to the simple aerated lagoon natural treatment system that requires less labor, electricity, chemical, and maintenance that the other options.

7.2.3 Recycled Water Sale Proceeds

Options 3, 4, and 5 will produce a marketable product in the form of R-1 recycled water that could be sold to users for irrigation purposes. The value of recycled water is a function of the value of the water that it replaces. In general, recycled water is sold to users at a fraction of the price of the water that is being replaced to provide a financial incentive to use the product. The typical recycled water price is 25 percent to 90 percent of the water it replaces.

The Pahala WWTP will be located at elevation 750 feet MSL. The cost to pump groundwater from the basal lens to the ground surface at the WWTP is approximately $1,078 per million gallons. Table 7-3 provides a summary of a recycled water sales assessment of each option, assuming the recycled water is sold for 90 percent of the cost of the irrigation water it would replace. Additional detail is provided in Appendix A.

Table 7 3. Summary of Annual Recycled Water Sale Proceeds

Option	Name	Annual Volume Recycled (Mgal)	Maximum Annual Sales Proceeds
1	Aerated lagoons/constructed wetland/land application	0	$0
2	R-1 treatment/land application	0	$0
3	R-1 treatment/seasonal water recycling	17	$17,000
4	R-1 treatment and storage for 100% water recycling	70	$68,000
5	Maximum practical treatment	17	$17,000

7.2.4 Life-Cycle Costs

Life-cycle costs represent the total costs to the community to construct and operate the wastewater treatment system over a 30-year period. The life-cycle cost evaluation includes capital and O&M costs, and recycled water sales proceeds as described above. In addition, equipment replacement allowances are included after 20-years of operation. The life-cycle cost evaluation includes an

inflationary factor to account for long-term changes in the value of money. The life-cycle costs are expressed as the Net Present Value (NPV). The NPV represents the amount of money that the County would need to set aside now in an interest-bearing account to cover all of the costs over the defined life-cycle. Table 7-4 provide a summary of the life-cycle cost evaluation. Additional detail can be found in Appendix A.

Table 7 4. Summary of Life Cycle Cost Estimates

Option	Name	Estimated Life-Cycle Cost
1	Aerated lagoons/constructed wetland/land application	$21.2 million
2	R-1 treatment/land application	$43.0 million
3	R-1 treatment/seasonal water recycling	$44.5 million
4	R-1 treatment and storage for 100% water recycling	$54.0 million
5	Maximum practical treatment	$59.0 million

As shown in the table, option 1 incurs the lowest life-cycle costs, and the other options would all incur over double to nearly triple the cost over the 30-year life-cycle. The life-cycle cost estimates are shown graphically in Figure 7-10. The operating costs shown in the figure include benefits (i.e., cost reductions) from recycled water sales where applicable.

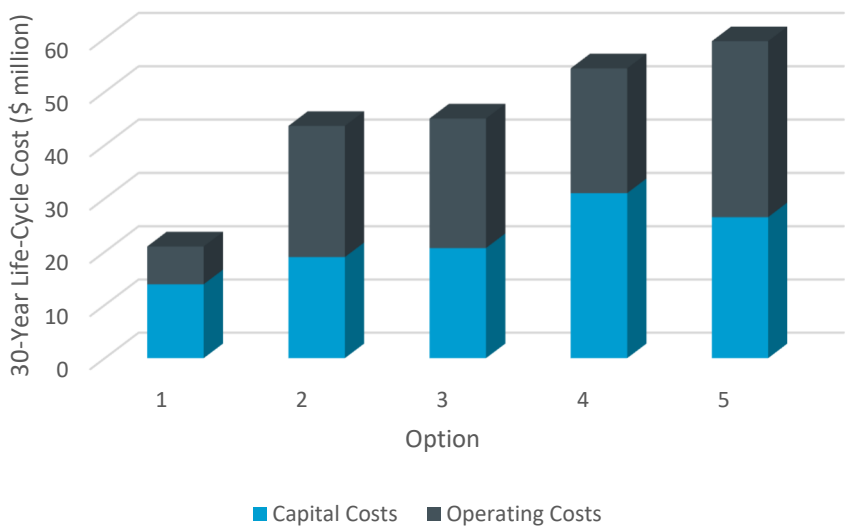


Figure 7-10. Life-Cycle Costs of Options

As shown in the graph, the operating cost differential between option 1 and the other options is the leading contributor to the lower life-cycle cost of option 1. The major operating cost differences are discussed below.

7.3 Non-Economic Discussion

The options are discussed on a non-economic basis below.

7.3.1 Labor Requirements

The Pahala WWTP will be operated by the COH DEM, Wastewater Division that is based in Hilo. The Hilo-based WWTP operators will regularly visit to facility to check the system status, make operational adjustments, and draw samples for required laboratory testing. In addition, maintenance personnel will visit the WWTP as needed to conduct equipment and electrical system repairs.

A major difference between option 1 and the other options is the frequency of routine operator visits required, and the number of personnel routinely required. Option 1 will require a single operator to normally visit the site once per week. The other options will require daily operator visits to conduct sampling that is required for R-1 compliance. In addition, options 2 through 5 consist of mechanical treatment technology that required more operator attention than option 1. Table 7-5 compares the operational labor differences for the options, as expressed as full-time equivalents (FTEs).

Table 7 5. Comparison of Operational Labor Requirements

Option	Name	Estimated Operational Labor Requirement (FTEs)
1	Aerated lagoons/constructed wetland/land application	0.3
2	R-1 treatment/land application	3.7
3	R-1 treatment/seasonal water recycling	3.7
4	R-1 treatment and storage for 100% water recycling	3.7
5	Maximum practical treatment	5.6

7.3.2 Operational Complexity

HAR 11-61 establishes operator certification requirements for WWTPs. The DOH requires that certified operators operate municipal WWTPs. The larger and/or more complex the wastewater treatment process, the higher grade of operator required at the facility. Options 1 through 5 were evaluated for operator certification requirements based on the criteria established in HAR 11-61. Table 7-6 summarizes the results of the evaluation. As shown in the table, option 1 would require a Grade I operator, while the other options would require a Grade IV operator (the highest grade). The higher requirements for options 2 through 5 are due to the complexity of the treatment processes compared to option 1. In general, the County has difficulty attracting and retaining Grade IV operators.

Table 7 6. Comparison of Operator Certification Requirements per HAR 11 61

Option	Name	Operator Certification Level Requirement
1	Aerated lagoons/constructed wetland/land application	I
2	R-1 treatment/land application	IV
3	R-1 treatment/seasonal water recycling	IV
4	R-1 treatment and storage for 100% water recycling	IV
5	Maximum practical treatment	IV

7.3.3 Energy Consumption

Figure 7-11 provides a comparison of the electrical energy requirements of the five options. As shown in the graph, option 1 will require significantly less electrical energy to operate, due to the use of natural treatment systems (aerated lagoons) instead of mechanical treatment processes that require more aeration and process pumping.

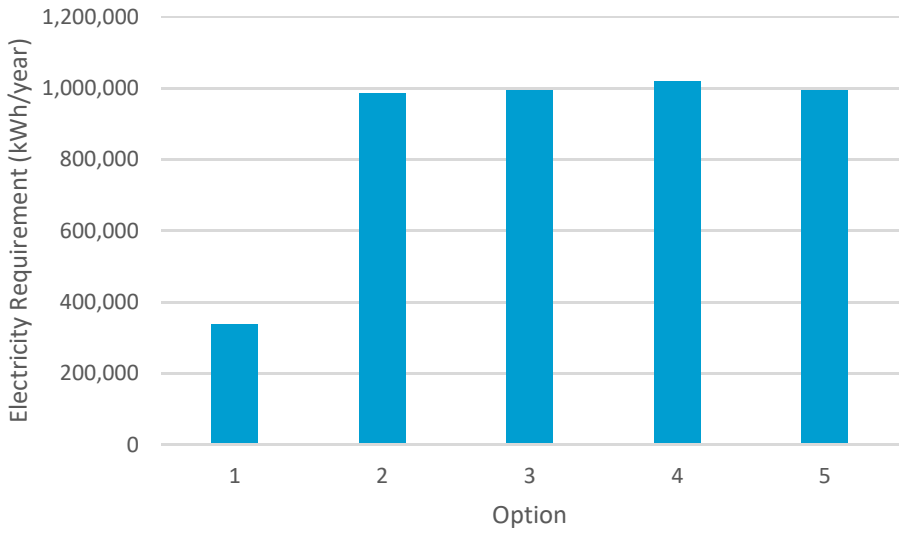


Figure 7-11. Comparison of Electrical Energy Requirements

7.3.4 Sludge Management

Sludge management for Option 1 is significantly different than the other options. The partial-mix aerated lagoon treatment system allows wastewater solids to accumulate at the bottom of the lagoon, forming a sludge blanket that slowly anaerobically digests. Sludge removal is infrequent, typically on the order once every 15 to 20 years. The resulting solids are well-digested and inoffensive due to the long retention time in the lagoons.

Options 2 through 5 would require an aerobic digester to stabilize and store waste solids from the activated sludge treatment process. The solids would need to be dewatered and trucked to a landfill on a weekly basis.

7.4 Living Machine®

Living Machine® technology was suggested during community outreach meetings. Living Machine® is a proprietary technology by Worrell Water Technologies that incorporates aerated tanks planted with vegetation to provide an attractive wastewater treatment process. In colder climates the aerated tanks are housed in a greenhouse for protection. In addition, subsurface flow wetlands with continuous and/or batch flow can be included in the process to provide desired treatment.

The Living Machine® technology has been implemented in “green” buildings like the San Francisco Public Utilities Commission building, the Port of Portland Headquarters, and others. Review of the company’s website did not reveal any municipal projects completed on the scale of what would be needed for Pahala. Therefore, the technology is considered to be not feasible.

It should be noted that the proposed non-proprietary treatment system (aerated lagoons and subsurface flow wetland) uses essentially the same natural treatment processes as the Living Machine®, but on a municipal scale.

7.5 Septic Tank Alternatives

A previous assessment recommended installation of a community septic tank and repurposing one of the existing LCCs to serve as a seepage pit (SSFM, July 2007), in accordance with Alternative 1 proposed to the community by the County in 2004 (County of Hawaii, November 5, 2004). This and other options that have been raised during the community outreach process that incorporate septic tank technology are discussed below.

7.5.1 Community Septic Tank

The effectiveness of a septic tank is directly related to the amount of hydraulic detention time provided by the tank volume. The previous study (SSFM, July 2007) suggested a 24-hour detention time would be adequate. Applying the current flow projections for the project indicate a 190,000-gallon tank would be appropriate if this criterion is used. However, for large community septic tanks it has been found that longer detention times are needed to optimize treatment performance, avoid the need for frequent septage pumping, and to account for peak flow rates that are developed by community wastewater collection systems. Applying appropriate design criteria (Crites and Tchobanoglous, 1998), to the project results in the need for an 800,000-gallon tank, which would require pumping on a 3-year interval. The area required for an appropriately-sized community septic tank would be approximately ¼ acre.

The use of a community septic tank would require the DOH to issue a variance to HAR 11-62-23.1, which requires WWTPs with design capacities greater than 100,000 gallons per day to produce effluent containing less than 30 mg/L of both BOD_5 and TSS – septic tanks are not able to produce effluent of this quality. A secondary treatment process is needed to comply with the effluent quality requirements contained in the DOH regulations. The County would need to reapply for the variance every 5-years, and if not renewed then secondary treatment would need to be provided.

Additionally, odors from a community septic tank present a significant concern. A septic tank is an anaerobic treatment process that produces hydrogen sulfide, reduced sulfur compounds, and other odorous gases. Odors emanating from septic tanks at individual residences are typically dispersed to the atmosphere throughout the community via the household plumbing roof vents. A community septic tank would concentrate the community's emissions to a single point source that would require foul air collection and treatment to avoid nuisance odor conditions. A dual-stage scrubber capable of treating approximately 3,600 cubic feet per minute of foul air would be required to avoid nuisance odor conditions. The dual-stage scrubber would consist of a biotrickling filter, followed by a granular activated scrubber.

7.5.2 Converting LCC to Seepage Pit

A previous study (SSFM, July 2007) suggested that the existing LCC located on the County-owned parcel TMK 9-6-002:024 could be converted to a seepage pit that would be regulated by DOH as an injection well. HAR 11-23-07 allows injection wells located mauka of the UIC line that were in existence prior to July 6, 1984 to continue to operate. However, the flow to the wells cannot increase, nor can a new well be constructed. Therefore, the earlier plan to convert the existing LCC to a seepage pit is not feasible for the following reasons:

- Closing LCC No. 2 that is located on private property would not be allowed, as it would increase the flow to LCC No. 1 (converted to a seepage pit that is regulated as an injection well) that is located on County property.

- The capacity, structure, and condition of the existing LCC No. 1 is not known. The LCC could either be a lava tube or a large conventional cesspool. A geotechnical investigation conducted on the site to depths of 30 to 35 feet did not reveal the presence of lava tubes (Masa Fujioka & Associates, January 9, 2007), therefore it is likely a large conventional cesspool. The County attempted to determine the structure and condition of the LCC via closed circuit TV inspection, but could not ascertain either due to technological limitations. It is not known if the LCC could accommodate the flow from the existing service area if LCC No. 2 is closed.
- HAR 11-62-25 requires new and proposed effluent disposal systems to have a backup disposal system capable of handling the peak flow. A second seepage pit cannot be constructed to comply with the regulatory requirement because the site is located mauka of the UIC line. If the existing seepage pit were to fail then a replacement cannot be constructed.
- The Kau Community Development Plan requires the County to provide for eventual construction of sewers throughout the community. Providing sewers for the entire community will increase wastewater flows considerably, as presented in Section 5. Increasing flow to the existing LCC (converted to a seepage pit) would not be allowed. Therefore, the use of the existing LCC as a disposal system could prevent the County from providing the community's desired future wastewater needs.

For these reasons, converting the existing LCC to a seepage pit is considered to be not feasible.

7.5.3 Leachfield Disposal

Leachfields are effluent disposal systems consisting of buried gravel-filled absorption trenches. Significant treatment occurs as septic tank effluent percolates through the soil surrounding the leachfield trenches. Leachfields are an integral part of residential septic systems, and DOH has established trench design criteria applicable to both residential and municipal-scale leachfields. In particular, HAR 11-62-34 requires trenches to be sized based on bottom area only. Application of the DOH criteria to the project yields a need for at least 30 acres of land to satisfy DOH hydraulic loading rate and redundancy requirements. Achieving even distribution of effluent over a leachfield of this size would be challenging at best. Therefore, leachfield disposal for the project is considered to be not feasible.

7.5.4 Conversion to Individual Wastewater Systems

The concept of a community wastewater system could be abandoned and all houses be required to construct individual wastewater systems comprised of a septic tank and leachfield. However, many of the lots in the community are small (less than 10,000 square feet) and significantly improved, making the feasibility of constructing individual wastewater systems on every lot uncertain. HAR 11-62-34 allows construction of seepage pits where there is insufficient land area to install absorption trenches (i.e., a leachfield), but prohibits construction in soils having percolation rates slower than 10 minutes per inch or where rapid percolation through such soils may result in contamination of water-bearing formations. The soils in the community are classified as Puueo-Naalehu complex, 3 to 10 percent slopes in the National Resource Conservation Service soil survey. This soil type consists of approximately 18 inches of extremely cobbly medial silt loam over cobbles and bedrock. This soil profile is too thin for conventional soil absorption trenches, so residents with sufficient space would be required to import fill soil to create elevated mound systems in accordance with HAR 11-62-34 to achieve adequate soil depth. Residents without sufficient space could potentially install seepage pits if suitable subsurface geology could be located. However, previous subsurface investigations in the community (Masa Fujioka & Associates, January 9, 2007, and Geolabs-Hawaii, September 23,

1998) revealed extremely permeable clinker layers and numerous lava tubes, both of which would not meet HAR 11-62-34 requirements for seepage pits. For these reasons, conversion to individual wastewater systems is considered to be not feasible.

Section 8

Alternative Site Evaluation

Nine sites were evaluated as potential locations for the Pahala WWTP. Each site was assessed for twenty-one criteria, in four broad categories: environmental, social and cultural; location and site; land use and availability; and collection system and service area.

8.1 Methodology

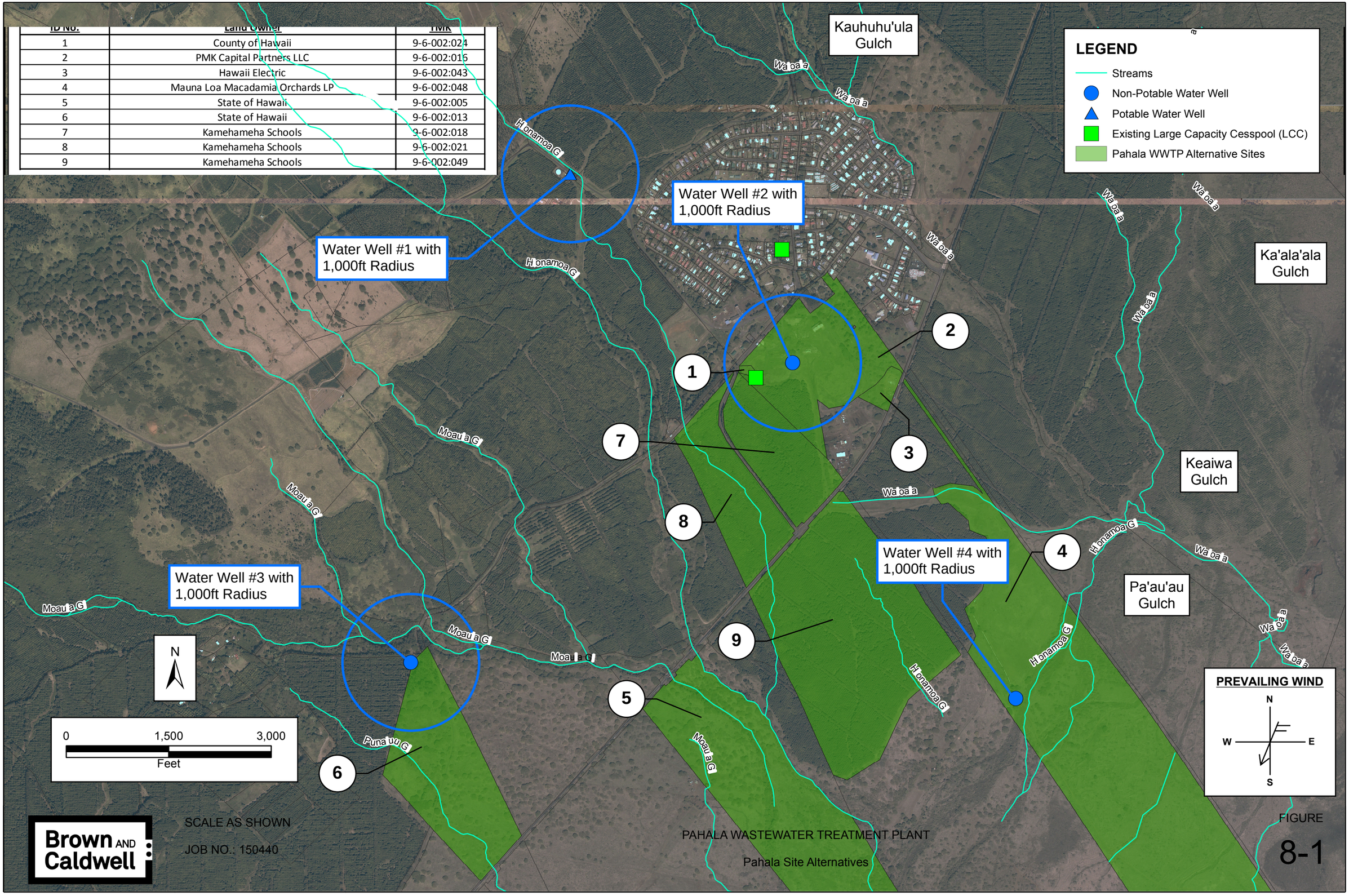
The site evaluation was performed according to the following process:

1. Potential sites for the Pahala WWTP were initially identified by the Department of Environmental Management. Additional sites were identified based on feedback from the Pahala community obtained during Community Outreach meetings that took place in December 2017.
2. Four general categories and twenty-one criteria were established and defined for the analysis.
3. Six "fatal flaw" conditions were identified. Sites with a fatal flaw were eliminated from further consideration.
4. Relative weighting factors were established for each category and criteria.
5. Sites were mapped using GIS. Data such as soil type, location of subsurface and surface water, topography, zoning and prevailing wind direction were determined.
6. Each site was evaluated and scored for the twenty-one criteria.
7. A weighted ranking was determined for each site, based on the weighting factors established in Step 4.
8. A preferred site was identified, based on the weighted high score.

8.2 Site Locations

Ownership, location, and proximity to the existing LCCs for all siting alternatives considered is illustrated in Figure 8-1.

This page intentionally left blank.



ID No.	Land Owner	TMK
1	County of Hawaii	9-6-002:024
2	PMK Capital Partners LLC	9-6-002:016
3	Hawaii Electric	9-6-002:043
4	Mauna Loa Macadamia Orchards LP	9-6-002:048
5	State of Hawaii	9-6-002:005
6	State of Hawaii	9-6-002:013
7	Kamehameha Schools	9-6-002:018
8	Kamehameha Schools	9-6-002:021
9	Kamehameha Schools	9-6-002:049

8.3 Criteria

The criteria used for the analysis are presented for each of four categories in Tables 8-1, 8-2, 8-3 and 8-4. A score was assigned to each criterion based on definitions included in the tables. A score of five represents a preferred or positive condition, and a score of one a less preferred or negative condition. A score of zero indicates a fatal flaw; six fatal flaw conditions were identified during the analysis are identified in the corresponding table.

Table 8-1 outlines the environmental, social, and cultural criteria considered in the analysis.

Table 8 1. Environmental, Social and Cultural Criteria

Criteria	Scoring and Definitions					
	5	4	3	2	1	0 = Fatal Flaw
Presence of or proximity to archaeological/cultural sites	No known or suspected sites	Confirmed or suspected sites and mitigatable	No information available	Confirmed or suspected sites and mitigation ability unknown	Confirmed sites and mitigation ability unknown	Confirmed sites and unmitigatable
Proximity of treatment units to existing occupied buildings	More than 1000 ft. from any occupied building		Between 50 and 1000 ft. from non-school building	Between 50 and 1000 ft. of school	Less than 50 ft from any occupied building	
Prevailing wind direction	Site is downwind of most of the community		Site is central		Site is upwind of most of the community	
Biology	Endangered or threatened species not present		Presence of endangered or threatened species unknown		Endangered or threatened species known to be present	Endangered or threatened species known to be present and unmitigatable
Visual impact	Natural visual mitigation (hill, berm, vegetation, remoteness) exists		Visible location, mitigatable with trees or other engineered buffers		Visible location, unmitigatable	
Contamination from prior land use	No suspected industry-related contamination issues		Presence of contamination unknown		Suspected or confirmed contamination issues	
Previously disturbed or developed	Yes		Partial		No previous development or disturbance	

The circumstance where a cultural or historical site is known to exist within the treatment facility footprint and mitigation to relocate, protect, or preserve that site is not possible, was identified as a fatal flaw condition.

From an environmental perspective, the presence of endangered or threatened species was considered negative. A site previously disturbed or developed was viewed as positive, unless contamination from a previous land use was suspected.

Considerations specific to social impact include proximity to occupied buildings (including residences, school, commercial establishments and others), prevailing wind direction, and visual impact.

Table 8-2 outlines the location and site characteristics considered in the analysis.

Table 8 2. Location and Site Characteristics

Criteria	Scoring and Definitions					
	5	4	3	2	1	0 = Fatal Flaw
Parcel size	More than 14.9 acres					Less than 14.9 acres
Soils type	Good soil and in sufficient amounts in area of parcel useable for disposal		Good soil but over limited area and disposal modification required		Marginal soil in area of parcel useable for disposal	No soil in area of parcel useable for disposal
Topography	Gentle slopes (less than 8%)		Moderate slopes (8% - 18%) or localized high/low points		Steep slopes (18% - 20%)	Extreme slopes (greater than 20%)
Proximity to water well	Outside of both 1000 ft. radius and upgradient influence zone of any well		Outside of 1000 ft. but suspected within upgradient influence zone of non-potable well		Within 1000 ft. or within upgradient influence zone of non-potable well	Within 1000 ft. or within upgradient influence zone of potable well
Presence of lava tubes	None		Possible or unknown		Known	
Proximity to surface water, intermittent stream or coast line	Treatment and disposal more than 500 ft. away		Treatment and disposal between 50 to 500 ft.		Treatment and disposal less than 50 ft. away	
Flood control / drainage	No risk of flooding		Flood risk unknown		Prone to flooding or within flood zone	
Vehicle access	Vehicle access currently exists		Existing easement, but new road or significant road upgrades required in or via county/private right if way	Existing easement, but new road or significant road upgrades required in or via state right-of-way	No current vehicle access or easement, access legally restricted, or significant obstruction to access	
Power and potable water availability	Utilities currently available at property line and within 400 ft. of site, no new easement required, no known significant obstructions (i.e. - culverts, streams, cultural sites)		Utilities available within 400 yds. of property or unknown		Potable water and/or power not currently available within 400 yds. of property and/or significant obstruction to utility construction	

Three fatal flaw conditions were identified for the location and site characteristics category in Table 8-2:

- Sites less than 14.9 acres in size, which is the least amount of land needed for treatment, disposal, and future growth.
- Average slopes greater than 20 percent, which significantly increase the cost of construction and limit design options.
- Location within a 1000-foot radius surrounding a potable water well, which is prohibited by HAR 11-62 for the protection of drinking water in the State of Hawaii.

Table 8-3 outlines the collection system and service area characteristics considered in the analysis.

Table 8 3. Collection System and Service Area Criteria

Criteria	Scoring and Definitions				
	5	4	3	2	1
Distance from LCC collection area	Parcel is adjacent to existing LCC or less than 0.25 miles away	Parcel is 0.25-0.5 mile away from existing LCC	Parcel is 0.5-1.0 miles away from existing LCC	Parcel is 1.0 – 1.5 miles away from existing LCC	Parcel is more than 1.5 miles away from existing LCC
Gravity flow possible or pumping required	Gravity flow possible				Pumping required for wastewater transmission from collection area to site
Number of properties newly accessible	Commercial areas become accessible		Additional individual residential properties become accessible outside of LCC service area		No additional properties become accessible

A site location requiring large transmission distances of more than two miles are less preferable due to both initial capital cost and future operations and maintenance requirements. Similarly, sites where wastewater can flow via gravity from the collection area are preferable to those requiring a pump station.

Newly accessible refers to properties within the service area that are not currently connected to the LCC, but will become accessible to the County-owned sewer system when the collection lines are relocated into the roadways fronting the property. Hawaii County Code requires connection of these properties once the new collection system is constructed, and their individual wastewater systems (cesspools or septic tanks) properly removed from service. All individual cesspools in the State of Hawaii must be converted or closed by the year 2050.

Table 8-4 outlines the land use and availability characteristics considered in the analysis.

Table 8 4. Land Use and Availability Criteria

Criteria	Scoring and Definitions				
	5	4	3	2	1
Current zoning and land use	WWTP currently permitted in zoning without Special Permit		WWTP possible onsite Special Permit required		WWTP not recommended on site
Land availability	Owner willing and able to sell or land currently government (state, county) owned	Subdivision required or friendly condemnation required	Difficult or lengthy approval process expected or owner willingness to sell unknown	Owner unwilling to sell or unfriendly condemnation of land required (private corporate owner)	Owner unwilling to sell or unfriendly condemnation required (private family owner)

Although public facilities are permitted in any zoning in the County of Hawaii, construction of a wastewater treatment facility requires a Special Permit within some zones. No fatal flaws were identified for the land use and availability category.

8.4 Criteria Weighting Factors

To consider the relative importance to the categories and criteria, each was assigned a weighting factor for the analysis. Weighting allows for appropriate consideration of all factors - both the technical and non-technical - associated with siting. Relative weighting is summarized in Table 8-5.

Table 8 5. Relative Weighting Factors

Category	Category Weight	Criteria	Criteria Weight
Environmental, social and cultural	35%	Presence of and/or proximity to archaeological/cultural sites	25%
		Proximity of treatment units to existing occupied buildings	25%
		Prevailing wind direction	25%
		Biology	10%
		Visual impact	5%
		Contamination from prior land use	5%
		Previously disturbed or developed	5%
			100%
Location and site characteristics	35%	Parcel size	25%
		Soils type	25%
		Topography	15%
		Proximity to water well	10%
		Presence of lava tubes	8%
		Proximity to surface water, intermittent stream or coast line	6%
		Flood control / drainage	5%
		Existing vehicle access	3%
		Power and potable water availability	3%
			100%
Collection system and service area	20%	Distance from LCC collection area	50%
		Gravity flow possible or pumping required	30%
		Number of properties newly accessible	20%
			100%
Land use and availability	10%	Current ownership	55%
		Current zoning and land use	45%
			100%

8.5 Raw Scores

For the nine sites identified in Figure 8-1, raw scores were assigned for each of the twenty-one criteria according to the definitions in Section 8.3. The results are presented in Table 8-6.

Table 8-6. Alternatives Analysis – Raw Scores

Category	Criteria	Site Raw Score								
		1	2	3	4	5	6	7	8	9
Environmental, social and cultural	Presence of and/or proximity to archaeological/cultural sites	5	1	2	3	3	3	4	3	3
	Proximity of treatment units to existing occupied buildings	3	3	5	5	5	5	5	5	5
	Prevailing wind direction	5	5	5	5	5	5	5	5	5
	Biology	3	3	3	3	3	3	3	3	3
	Visual impact	3	3	3	5	5	5	3	3	3
	Contamination from prior land use	3	1	3	1	3	3	3	3	3
	Previously disturbed or developed	5	5	5	3	3	3	5	5	5
Location and site characteristics	Parcel size [a]	0	5	0	5	5	5	5	5	5
	Soils type	5	1	1	3	5	1	5	5	5
	Topography	3	5	3	5	3	5	3	3	5
	Proximity to water well [b]	0	5	5	3	5	5	5	5	5
	Presence of lava tubes	1	1	3	3	3	3	3	3	3
	Proximity to surface water, intermittent stream or coast line	5	5	5	5	3	5	5	1	5
	Flood control / drainage	3	3	3	3	3	1	3	3	3
	Existing vehicle access	5	5	2	2	2	5	5	5	2
	Power and potable water availability	3	3	3	1	1	1	3	3	1
Collection system and service area	Distance from LCC collection area	5	5	4	3	3	2	5	4	3
	Gravity flow possible or pumping required	5	5	5	5	1	1	5	5	5
	Number of properties newly accessible	3	3	3	3	3	3	3	3	3
Land use and availability	Current zoning and land use	3	3	3	3	3	3	3	3	3
	Current ownership	5	5	3	3	5	5	4	4	4
	Raw score totals (maximum possible = 105)	***FF***	***75***	***FF***	***72***	***72***	***72***	***85***	***79***	***79***

[a] *Fatal flaw condition for Sites 1 and 3.*

[b] *Fatal flaw condition for Site 1.*

As indicated in Table 8-6, fatal flaw conditions were identified for Site 1 (due to both parcel size and proximity to a drinking water well) and Site 3 (due to parcel size). These two sites were removed from further analysis.

8.6 Weighted Analysis

The weighted analysis is presented in Table 8-7.

Table 8-7. Alternatives Analysis – Weighted Scoring

Category	Criteria	Site Weighted Score								
		1	2	3	4	5	6	7	8	9
Environmental, social and cultural	Presence of and/or proximity to archaeological/cultural sites		0.25		0.75	0.75	0.75	1.00	0.75	0.75
	Proximity of treatment units to existing occupied buildings		0.75		1.25	1.25	1.25	1.25	1.25	1.25
	Prevailing wind direction		1.25		1.25	1.25	1.25	1.25	1.25	1.25
	Biology		0.30		0.30	0.30	0.30	0.30	0.30	0.30
	Visual impact		0.15		0.25	0.25	0.25	0.15	0.15	0.15
	Contamination from prior land use		0.05		0.05	0.15	0.15	0.15	0.15	0.15
	Previously disturbed or developed		0.25		0.15	0.15	0.15	0.25	0.25	0.25
Location and site characteristics	Parcel size [a]		1.25		1.25	1.25	1.25	1.25	1.25	1.25
	Soils type		0.25		0.75	1.25	0.25	1.25	1.25	1.25
	Topography		0.75		0.75	0.45	0.75	0.45	0.45	0.75
	Proximity to water well [b]		0.50		0.30	0.50	0.50	0.50	0.50	0.50
	Presence of lava tubes		0.08		0.24	0.24	0.24	0.24	0.24	0.24
	Proximity to surface water, intermittent stream or coast line		0.30		0.30	0.18	0.30	0.30	0.18	0.30
	Flood control / drainage		0.15		0.15	0.15	0.05	0.15	0.15	0.15
	Existing vehicle access		0.15		0.06	0.06	0.15	0.15	0.15	0.06
	Power and potable water availability		0.09		0.03	0.03	0.03	0.09	0.09	0.03
Collection system and service area	Distance from LCC collection area		2.50		1.50	1.50	1.00	2.50	2.00	1.50
	Gravity flow possible or pumping required		1.50		1.50	0.30	0.30	1.50	1.50	1.50
	Number of properties newly accessible		0.60		0.60	0.60	0.60	0.60	0.60	0.60
Land use and availability	Current zoning and land use		1.35		1.35	1.35	1.35	1.35	1.35	1.35
	Current ownership		2.75		1.65	2.75	2.75	2.20	2.20	2.20
	Overall weighted totals (maximum possible = 5)	***FF***	***3.61***	***FF***	***3.76***	***3.76***	***3.46***	***4.33***	***4.06***	***4.10***

[a] *Fatal flaw condition for Sites 1 and 3.*

[b] *Fatal flaw condition for Site 1.*

8.7 Results

The results of the analysis are presented in Table 8-8. Two sites were identified as having fatal flaws and the remaining seven were ranked in accordance with the overall weighted score.

Table 8 8. Alternative Site Ranking

Rank	Site
1	7
2	9
3	8
4	5
5	4
6	2
7	6
FF	1
FF	3

The top three sites for the Pahala WWTP are:

1. Site 7 (TMK 9-6-002:18)
2. Site 9 (TMK 9-6-002:49)
3. Site 8 (TMK 9-6-002:21)

Site 7 is preferred to the second and third ranked sites for the following reasons:

- A preliminary Archaeological Inventory Survey has been performed for Site 7, indicating no unmitigable cultural sites on the property.
- Site 8 is bisected by an intermittent stream bed, and a steep gulch borders the property to the west.
- Site 7 is closer to the existing collection area than both Site 8 and Site 9.
- Power and potable water are more readily available to Site 7. Site 9 will require the utilities to cross the highway.

8.8 Conclusion

Based on the analysis, Site 7 (TMK 9-6-002:18) was selected as the preferred location for the Pahala WWTP.

Section 9

References

CH2MHILL. Kau High School and Pahala Elementary School Connection to County Sewer. July 2017.

County of Hawaii. Letter to Community Homeowners, signed by Mayor Harry Kim. November 5, 2004.

Crites, Ron, and George Tchobanoglous. Small and Decentralized Wastewater Management Systems. WCB McGraw-Hill, 1998.

Crites, Ronald W., E. Joe Middlebrooks, Robert K. Bastian, and Sherwood C. Reed. "Natural Wastewater Treatment Systems, Second Edition". CRC Press, 2014.

Crites, Ronald W., E. Joe Middlebrooks, Sherwood C. Reed. Natural Wastewater Treatment Systems. CRC Taylor & Francis, 2006.

Crites, Ronald W., Sherwood C. Reed, and Robert K. Bastian. "Land Treatment Systems for Municipal and Industrial Wastes". McGraw-Hill, 2000.

Department of Planning, County of Hawaii. Kau Community Development Plan. October 2017.

Department of Wastewater Management, City and County of Honolulu, State of Hawaii. Design Standards of the Department of Wastewater Management, Volume 1 and 2. July 2017.

Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. Recommended Standards for Wastewater Facilities. 1997.

Hawaii Administrative Rules (HAR), Title 11, Department of Health Administrative Rules.

Masa Fujioka & Associates. Letter Report, Probing for Large Cavities (Lava Tubes), Naalehu and Pahala Large Capacity Cesspool Sewerage System. January 9, 2007.

M&E Pacific, Inc. Kau Sewer System Evaluation, Kau, Island of Hawaii, Hawaii. December 2004.

Reed, Sherwood C., Ronald W. Crites, E. Joe Middlebrooks. Natural Systems for Waste Management and Treatment. McGraw-Hill, Inc. 1995.

Rich, Linvil G. High Performance Aerated Lagoon Systems. American Academy of Environmental Engineers, 1999.

SSFM International, Inc. Final Preliminary Engineering Report for Naalehu and Pahala Large Capacity Cesspool Conversion Projects, July 2007.

USEPA. "Process Design Manual, Land Treatment of Municipal Wastewater Effluents". EPA/625/R-06/016. September 2006.

Water Environment Federation. *Wastewater Disinfection, Manual of Practice FD-10*. Water Environment Federation, 1996.

Water Pollution Control Federation. Aeration, Manual of Practice FD-13. 1988.

White, George Clifford, *Handbook of Chlorination and Alternative Disinfectants*, John Wiley & Sons Inc., New York, 1999.

This page intentionally left blank.

Appendix A: Cost Estimates

This page intentionally left blank.

County of Hawaii Department of Environmental Management

Pahala WWTP
Preliminary Design - Order of Magnitude Construction Cost

Electrical and instrumentation	$	1,976,000
Headworks	$	906,000
Odor Control	$	412,000
Lagoons	$	2,222,000
Wetland	$	611,000
Land Application	$	925,000
On-site improvements	$	6,325,000
Off-site improvements	$	1,223,000
Total Estimated Construction Cost	**$**	**14,600,000**

Description	Quantity	Units	Unit Cost	Extension
Clear and grub	18.0	AC	$5,995	$107,910
BMP's	18.0	AC	$13,080	$235,440
Archaeological Monitoring	18	AC	$2,507	$45,126
Earthwork	52,000	CY	$25	$1,300,000
Sewerline extension	700	LF	$218	$152,600
Operations building	1,500	SF	$500	$750,000
Generator and tank	1	LS	$250,000	$250,000
Fencing	3,200	LF	$164	$523,200
Paving	38,000	SY	$55	$2,071,000
Off-site waterline	2,500	LF	$327	$817,500
On-site waterline	900	LF	$164	$147,150
On-site fireline	750	LF	$218	$163,500
Off-site overhead electrical	1	LS	$50,000	$50,000
Trees (landscaping & Irrigation)	10	EA	$2,500	$25,000
Headworks	1	EA	$501,339	$501,339
Odor control unit	1	EA	$329,797	$329,797
Lagoons	1	LS	$1,816,902	$1,816,902
Constructed Wetland	1	LS	$489,000	$489,000
Chlorine contact tank	1	LS	$150,000	$150,000
Chlorine feed system	1	LS	$26,577	$26,577
Land Application piping	2,700	LF	$125	$337,500
Land Application trees/ground cover	5.5	AC	$5,000	$27,500
Effluent flow meter and sampler	1	LS	$154,780	$154,780
			Subtotal	$10,472,000
		On-site electrical	15%	$1,570,800
		Mobilization/Demoblization	1.0%	$104,720
			Total	$12,148,000
		Contingency	20%	$2,430,000
TOTAL ORDER OF MAGNITUDE CONSTRUCTION COST				**$14,600,000.00**

County of Hawaii Department of Environmental Management

Pahala WWTP
Preliminary Options Assessment - Capital Costs

Wetlands

Description	Quantity	Units	Unit Cost	Extension
linear	13,100	SF	$4	$52,400
gravel	1,000	CY	$50	$50,000
piping	500	LF	$100	$50,000
Effluent Structure	1	EA	$50,000	$50,000
Standpipe	1	EA	$25,000	$25,000
plantings	13,100	sf	$20	$262,000
			Subtotal	$489,000

County of Hawaii Department of Environmental Management

Pahala WWTP
Options Assessment Cost Summary

Capital Costs

Option No.	Treatment	Disposal	Recycling	Capital Cost ($M)								**Total ($M)**
				Lagoons	R-1	Limit of TT	Disposal	Reservoir	Diurnal Tank	R-1 Pumps	R-1 Pipelines	
1	Aerated lagoons/wetland/disinfection	Land application	None	10.8			3.8					**14.6**
2	MBR (R-1)	Land application	None		14.6		3.8					**18.4**
3	MBR (R-1)	Land application	Seasonal (25% of total annual flow)		14.6		3.8		0.8	0.5	0.5	**20.2**
4	MBR (R-1)	Land application	Annual storage reservoir (100% of flow)		14.6		3.8	6.1	3.5	1.0	1.5	**30.4**
5	Limit of treatment technology	Land application	Seasonal (25% of total annual flow)			20.4	3.8		0.8	0.5	0.5	**26.0**

Annual O&M Costs

No.	Treatment	Disposal	Recycling	Annual O&M Costs ($)					
				Labor	Electricity	Chemicals	Maintenance	Sludge Mgmt	Total
1	Aerated lagoons/wetland/disinfection	Land application	None	$42,000	$118,000	$12,000	$54,000	$10,000	$236,000
2	MBR (R-1)	Land application	None	$582,000	$345,000	$10,000	$73,000	$42,000	$1,052,000
3	MBR (R-1)	Land application	Seasonal (25% of total annual flow)	$582,000	$348,000	$10,000	$73,000	$42,000	$1,055,000
4	MBR (R-1)	Land application	Annual storage reservoir (100% of flow)	$582,000	$356,000	$10,000	$73,000	$42,000	$1,063,000
5	Limit of treatment technology	Land application	Seasonal (25% of total annual flow)	$874,000	$348,000	$35,000	$102,000	$62,000	$1,421,000

Annual Recycled Water Sales

No.	Treatment	Disposal	Recycling	Annual R-1 Water Sales	
				High Price	Low Price
1	Aerated lagoons/wetland/disinfection	Land application	None	$0	$0
2	MBR (R-1)	Land application	None	$0	$0
3	MBR (R-1)	Land application	Seasonal (25% of total annual flow)	$17,000	$9,000
4	MBR (R-1)	Land application	Annual storage reservoir (100% of flow)	$68,000	$38,000
5	Limit of treatment technology	Land application	Seasonal (25% of total annual flow)	$17,000	$9,000

Equipment Replacement at 20-Years

No.	Treatment	Disposal	Recycling	Equipment Replacement
1	Aerated lagoons/wetland/disinfection	Land application	None	$2,693,000
2	MBR (R-1)	Land application	None	$3,653,000
3	MBR (R-1)	Land application	Seasonal (25% of total annual flow)	$3,653,000
4	MBR (R-1)	Land application	Annual storage reservoir (100% of flow)	$3,653,000
5	Limit of treatment technology	Land application	Seasonal (25% of total annual flow)	$5,097,000

County of Hawaii Department of Environmental Management
Pahala WWTP
Preliminary Options Assessment - Capital Costs

Common Capital Inputs

Current ENRCCI:	10870
Area markup factor:	30%
Contingency factor:	20%
Project soft costs factor:	25%

Lagoon-Wetland Treatment

Description	Quantity	Units	Unit Cost	Extension
Clear and grub	8	AC	$15,000	$120,000
BMPs	8	AC	$13,000	$104,000
Earthwork	9,500	CY	$25	$237,500
Sewer extension	700	LF	$160	$112,000
Headworks	1	EA	$500,000	$500,000
Lagoons	1	LS	$1,800,000	$1,800,000
Wetlands	1	LS	$350,000	$350,000
Chlorine contact tank	1	LS	$100,000	$100,000
Chlorine feed system	1	LS	$30,000	$30,000
Operations building	1,500	SF	$500	$750,000
Generator and tank	1	LS	$250,000	$250,000
Fencing	1,500	LF	$100	$150,000
Paving	15,000	SY	$55	$825,000
Water line extension	1,500	LF	$160	$240,000
Yard piping	1	LS	$200,000	$200,000
Miscellaneous site work	1	LS	100,000	$100,000
HELCO power	1	LS	50,000	$50,000
Hawaiian Telcom	1	LS	20,000	$20,000
Archeological monitoring	8	AC	2,500	$20,000
Visual buffer trees and irrigation	10	EA	2,500	$25,000
Subtotal				$5,983,500
Electrical and instrumentation			20%	$1,196,700
Total construction				$7,180,200
Contingency				$1,436,040
Total construction				$8,616,240
Project soft costs				$2,154,060
Total project cost:				**$10.770 million**

Land Application

Description	Quantity	Units	Unit Cost	Extension
Clear and grub	6	AC	$15,000	$82,500
BMPs	6	AC	$13,000	$71,500
Earthwork	33,500	CY	$25	$837,500
Fencing	1,700	LF	$100	$170,000
Paving	23,000	SY	$30	$690,000
Yard piping	3,500	LF	$160	$560,000
Planting	6	AC	10,000	$60,000
Effluent flow meter and sampler	1	LS	50,000	$50,000
Archeological monitoring	6	AC	2,500	$15,000
Subtotal				$2,536,500
Electrical and instrumentation			0%	$0
Total construction				$2,536,500
Contingency				$507,300
Total construction				$3,043,800
Project soft costs				$760,950
Total project cost:				**$3.805 million**

R-1 Treatment

Capacity:	0.19	mgd	
Mainland cost at current ENRCCI:	$39.44	/gpd	from R-1 WWRF capital regression. y=24.003*(x^-0.299)
Local construction cost:	$51.27	/gpd	
Construction estimate:	$9.7	million	
Contingency:	$1.9	million	
Total construction cost:	$11.7	million	
Project soft costs:	$2.9	million	
Total project cost:	**$14.6**	**million**	

Limit of Treatment Technology

ENRCCI of estimate:	8952		
10 mgd WWTP cost:	$13.80	/gpd	
10 mgd WWTP cost at current ENRCCI:	$16.76	/gpd	
Local 10 mgd WWTP cost:	$21.78	/gpd	
Small flow escalation:	$71.54	/gpd	y=43.47x^-0.3 Per WERF analysis. BNR + advanced nutrient removal
Construction estimate:	$13.6	million	
Contingency:	$2.7	million	
Total construction cost:	$16.3	million	
Project soft costs:	$4.1	million	
Total project cost:	**$20.4**	**million**	

Seasonal Storage Reservoir

Volume:	124	ac-ft	
Mainland construction cost:	$25,000	/ac-ft	
Subtotal:	$3.1	million	
Local construction cost:	$4.0	million	
Contingency:	$0.8	million	
Total construction cost:	$4.8	million	
Project soft costs:	$1.2	million	
Total project cost:	**$6.1**	**million**	

Diurnal R-1 Tank - Seasonal Program

Volume:	0.19	mgal	1 peak day
Local construction cost:	$3.00	/gallon	
Subtotal:	$0.6	million	
Contingency:	$0.1	million	
Total construction cost:	$0.7	million	
Project soft costs:	$0.1	million	
Total project cost:	$0.8	million	

Diurnal R-1 Tank - Reservoir Program

Volume:	0.77	mgal	1 peak day
Local construction cost:	$3.00	/gallon	
Subtotal:	$2.3	million	
Contingency:	$0.5	million	
Total construction cost:	$2.8	million	
Project soft costs:	$0.69	million	
Total project cost:	$3.5	million	

R-1 Delivery Pumps - Seasonal Program

Peak day flow	0.19	mgal
Delivery time:	8	hours
Pumping capacity:	396	gpm
Mainland construction cost @ ENRCCI 4500:	$100,000	
Current mainland construction cost:	$242,000	
Local construction cost:	$315,000	
Contingency:	$63,000	
Total construction cost:	$378,000	
Project soft costs:	$94,500	
Total project cost:	$0.5	million

R-1 Delivery Pumps - Reservoir Storage

Peak day flow	0.77	mgal
Delivery time:	8	hours
Pumping capacity:	1604	gpm
Mainland construction cost @ ENRCCI 4500:	$200,000	
Current mainland construction cost:	$483,000	
Local construction cost:	$628,000	
Contingency:	$125,600	
Total construction cost:	$753,600	
Project soft costs:	$188,400	
Total project cost:	$1.0	million

R-1 Pipelines - Seasonal Program

Peak delivery rate:	396	gpm
Pipeline diameter:	6	inches
Hawaii construction cost:	$25	/in-ft
Estimated length:	2000	feet
Local construction cost:	$300,000	
Contingency:	$60,000	
Total construction cost:	$360,000	
Project soft costs:	$90,000	
Total project cost:	$0.5	million

R-1 Pipelines - Reservoir Storage

Peak delivery rate:	1604	gpm
Pipeline diameter:	10	inches
Hawaii construction cost:	$25	/in-ft
Estimated length:	4000	feet
Local construction cost:	$1,000,000	
Contingency:	$200,000	
Total construction cost:	$1,200,000	
Project soft costs:	$300,000	
Total project cost:	$1.5	million

County of Hawaii Department of Environmental Management

Pahala WWTP
Preliminary Options Assessment
O&M Costs

Common O&M Inputs

Labor cost:	$100	/hr (loaded)
FTE effective labor:	1,560	hours/year
Chlorine tab cost:	$4	/lb
Alum cost:	$2	/lb
Electricity cost:	$0.35	/kWh
Maintenance cost:	2%	/year of equipment capital
Sludge management cost:	$1,500	/dry ton, dewatering, hauling, tip fee
Average flow:	0.19	mgd

Lagoon Treatment/Wetlands/Disinfection

Labor

Normal requirement:	1	visit/week
Operators/visit:	1	
Time per visit:	8	hours/visit
Weekly labor hours:	8	hours/week
Annual labor hours:	416	hours/year
FTEs:	0.3	FTEs
Annual labor cost:	**$41,600**	/yr

Electricity

Load	Equiv hp	Percent	kWhr/mo	$/month
Aerators	50	100%	26,845	$9,396
Screens	2	10%	107	$38
Chlorine pumps	0.5	30%	81	$28
Effluent pumps	2	100%	1,074	$376
Totals				$9,837

Annual power cost:	**$118,049**	
Annual power consumption:	337283	kWh/yr

Chemicals

Chlorine dose:	5	mg/L
Daily use:	8	lbs/d
Annual use:	2892	lbs/d
Annual cost:	**$11,568**	/yr

Maintenance

Equipment cost:	$2,692,575	(assume 25% of capital cost)
Annual maintenance:	**$53,852**	/yr

Sludge Management

Production rate:	0.1	dry tons/mgal
Annual production:	6.935	/dry tons
Sludge management cost:	$10,403	/year (deferred for 20 years)

R-1 Treatment

Labor

Normal requirement:	7	visits/week
Operators/visit:	2	
Time per visit:	8	hours/visit
Weekly labor hours:	112	hours/week
Annual labor hours:	5824	hours/year
FTEs:	3.7	FTEs
Annual labor cost:	**$582,400**	

Electricity

Daily power use:	2,700	kWh/d
Annual power use:	985,500	kWh/yr
Annual power cost:	**$344,925**	/yr

Chemicals

Annual chemical cost:	$10,000	

Maintenance

Equipment cost:	$3,652,973	(assume 25% of capital cost)
Annual maintenance:	**$73,059**	/yr

Sludge Management

Sludge production:	0.4	dry tons/mgal
Annual production:	28	/dry tons
Sludge management cost:	**$41,610**	/year

Limit of Treatment Technology

Labor

Normal requirement:	7	visits/week
Operators/visit:	3	
Time per visit:	8	hours/visit
Weekly labor hours:	168	hours/week
Annual labor hours:	8736	hours/year
FTEs:	5.6	FTEs
Annual labor cost:	**$873,600**	

Electricity

Daily power use:	2,700	kWh/d
Annual power use:	985,500	kWh/yr
Annual power cost:	**$344,925**	/yr

Chemicals

Alum dose	30	mg/L
Alum use:	48	lbs/d
Alum cost:	**$34,703**	/yr

Maintenance

Equipment cost:	$5,097,397	(assume 25% of capital cost)
Annual maintenance:	**$101,948**	/yr

Sludge Management

Sludge production:	0.6	dry tons/mgal
Annual production:	42	/dry tons
Sludge management cost:	**$62,415**	/year

Seasonal Water Recycling (25%)

Load	Equiv hp	Percent	kWhr/mo	$/month
R-1 delivery pumps	5	25%	671	$235
Totals				$235

Annual power cost:	**$2,819**	
Annual power consumption:	8054	kWh/yr

Annual Water Recycling (100%)

Load	Equiv hp	Percent	kWhr/mo	$/month
R-1 delivery pumps	5	100%	2,685	$940
Totals				$940

Annual power cost:	**$11,275**	
Annual power consumption:	32214	kWh/yr

County of Hawaii Department of Environmental Management
Pahala WWTP

R-1 Sales Assessment

Avoided Cost of Pumping Irrigation Water

Assume pumping from basal lens

Elevation at WWTP:	750	feet MSL
Flow rate:	1000	gpm
	2.2	cfs
Pump efficiency:	85%	
Motor efficiency:	90%	
Power cost:	$0.35	/kWh
BHP:	223	hp
Motor draw:	185	kW
Unit volume:	1	mgal
Time to pump unit vol:	16.7	hours
Power to pump unit vol:	3080	kWh
Cost to pump unit vol:	$1,078	

Recycled Water Pricing

High price:	90%	of avoided cost
Low price:	50%	of avoided cost

Recycled Water Sales

High price:	$970	/mgal
Low price:	$539	/mgal

Seasonal Recycling Sales

Annual reuse volume:	17	mgal
High price sales:	$16,661	/year
Low price sales:	$9,256	/year

100% Recycling Sales

Annual reuse volume:	70	mgal
High price sales:	$67,987	/year
Low price sales:	$37,770	/year

County of Hawaii, DEM
Pahala WWTP Options Assessment
Alternatives Net Present Value Analysis

Agency: County of Hawaii, DEM

Project/Problem: Pahala WWTP Options Assessment

		Risk Premium	Sensitivity Adjustments (%)			Results		
			Benefits	Capital Costs	Other Costs	Capital Cost	30-year NPV	Benefit over Status Quo
Alternative 1	Lagoons / wetlands/ disinfection / land application					$14,600,000	($21,196,947)	
Alternative 2	R-1 treatment / land application					$18,400,000	($42,993,152)	($21,796,205)
Alternative 3	R-1 treatment / seasonal recycling (25%)					$20,200,000	($44,496,467)	($23,299,520)
Alternative 4	R-1 treatment / annual storage res (100%)					$30,400,000	($53,785,222)	($32,588,276)
Alternative 5	Limit of treatment technology / 25% recycle					$26,000,000	($58,961,593)	($37,764,647)
Alternative 6								
Alternative 7								
Alternative 8								
Alternative 9								
Alternative 10								
Alternative 11								
Alternative 12								

Year of analysis: 2017
Escalation rate: 3.20%
Discount rate: 5.50%

Select one
- (●) All entries in dollars
- ( ) All entries in thousands of dollars

Note: "Status quo" refers to Alternative 1

Make entries in yellow cells only

County of Hawaii Department of Environmental Management

Pahala WWTP
Preliminary Options Assessment
Operator Requirement Evaluation

No.	Treatment	Disposal	Recycling
1	Aerated lagoons/disinfection	Land application	None
2	MBR (R-1)	Land application	None
3	MBR (R-1)	Land application	Seasonal (25% of total annual flow)
4	MBR (R-1)	Land application	Annual storage reservoir (100% of flow)
5	Limit of treatment technology	Land application	Seasonal (25% of total annual flow)

	Option				
Criteria per HAR 11-61	1	2	3	4	5
Population served	1	1	1	1	1
Design average flow	1	1	1	1	1
Effluent discharge	2	2	6	6	6
Variation on raw wastes	0	0	0	0	0
Pretreatment	5	10	10	10	10
Primary treatment	0	0	0	0	0
Secondary treatment	8	15	15	15	20
Advanced waste treatment	0	12	12	12	22
Additional treatment processes	7	7	7	7	7
Solids handling	0	19	19	19	19
Disinfection	5	10	10	10	10
Laboratory control bacteriological	0	0	0	0	0
Laboratory control chemical/physical	0	0	0	0	0
Total points	29	77	81	81	96
WWTP Classification per 11-61	I	IV	IV	IV	IV

County of Hawaii Department of Environmental Management
Pahala WWTP
Water Recycling Assessments

Seasonal Recycling with Disposal

Average flow: 0.19 mgd
Irrigated acreage: 62 acres

Month	Days	WW Flow (mgal)	Irrig Demand (gpd/ac)	Irrig Demand (mgal)	Disposal (mgal)
Jan	31	5.9	0	0.0	5.9
Feb	28	5.3	0	0.0	5.3
Mar	31	5.9	0	0.0	5.9
Apr	30	5.7	644	1.2	4.5
May	31	5.9	2,244	4.3	1.6
Jun	30	5.7	3,043	5.7	0.0
Jul	31	5.9	1,348	2.6	3.3
Aug	31	5.9	1,452	2.8	3.1
Sep	30	5.7	334	0.6	5.1
Oct	31	5.9	0	0.0	5.9
Nov	30	5.7	0	0.0	5.7
Dec	31	5.9	0	0.0	5.9
Totals	365	69.35		17	52

Recycling efficiency: 25%

Recycling with Annual Storage Reservoir

Average flow: 0.19 mgd
Irrigated acreage: 253 acres
Reservoir surface area: 6.4 acres
Reservoir pan coefficient: 0.7

Month	Days	WW Flow (mgal)	Irrig Demand (gpd/ac)	Irrig Demand (mgal)	WW in (mgal)	Precipitation in (inches)	Precipitation in (mgal)	Pan Evap (inches)	Evap out Inches	Evap out (mgal)	Delta Storage (mgal)	Cumulative Storage (mgal)	Cumulative Storage (ac-ft)	Water Depth (feet)
					Reservoir Storage									
Jan	31	5.9	0	0.0	5.9	5.98	1.0	4.55	3.2	0.6	6.4	28.1	86.3	13.5
Feb	28	5.3	0	0.0	5.3	3.77	0.7	4.54	3.2	0.6	5.4	33.5	102.9	16.1
Mar	31	5.9	0	0.0	5.9	5.45	0.9	4.97	3.5	0.6	6.2	39.8	122.0	19.1
Apr	30	5.7	644	4.9	0.8	3.23	0.6	5.4	3.8	0.7	0.7	40.5	124.2	19.4
May	31	5.9	2244	17.6	-11.7	1.94	0.3	5.6	3.9	0.7	-12.1	28.4	87.3	13.6
Jun	30	5.7	3043	23.1	-17.4	1.56	0.3	5.94	4.2	0.7	-17.8	10.6	32.5	5.1
Jul	31	5.9	1348	10.6	-4.7	3.27	0.6	6.37	4.5	0.8	-4.9	5.7	17.5	2.7
Aug	31	5.9	1452	11.4	-5.5	3.08	0.5	6.23	4.4	0.8	-5.7	0.0	0.0	0.0
Sep	30	5.7	334	2.5	3.2	3.6	0.6	5.55	3.9	0.7	3.1	3.1	9.6	1.5
Oct	31	5.9	0	0.0	5.9	3.98	0.7	5.05	3.5	0.6	6.0	9.1	27.9	4.4
Nov	30	5.7	0	0.0	5.7	6.7	1.2	4.49	3.1	0.5	6.3	15.4	47.3	7.4
Dec	31	5.9	0	0.0	5.9	5.82	1.0	4.62	3.2	0.6	6.3	21.7	66.7	10.4
Totals	365	69.35		70		48.4	8.4	63.3		7.7	0.0			

Recycling efficiency: 101%

Max Volume: 40 Mgal
124 ac ft

Peak demand: 23.1 mgal/mo
0.77 mgd

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix C

August 2018 Biological Survey Report

AECOS No. 1545

Biological survey for the Pāhala Community Large Capacity Cesspool Closure Project on lot TMK: 9-6-002:018, Kaʻū District, Hawaiʻi Island

Prepared by:

AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe, Hawaiʻi 96744-3221

August 16, 2018

Biological survey for the Pāhala Community Large Capacity Cesspool Closure Project on lot TMK: 9-6-002:018, Kaʻū District, Hawaiʻi Island

August 16, 2018 | ***Draft*** | *AECOS* No. 1545

Eric Guinther and Reginald David
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe , Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: guinther@aecos.com

Introduction

The Hawaiʻi County Department of Environmental Management, Wastewater Division is proposing to construct a wastewater treatment and disposal system ("Project") to treat sewage collected in Pāhala, Kaʻū District. The treatment and disposal system will be located on a property identified as TMK: 9-6-002:018, north of the intersection of Hawaii Belt Road (Māmalahoa Highway) and Maile Street. This report describes methods used and results of a biological survey conducted in the Project area in August 2018. The primary purpose of the survey was to determine whether any species currently proposed or listed as threatened or endangered under either federal or state endangered species statutes occur on, or could utilize resources within, the Project area.

Project and Site Descriptions

The WWTP site encompasses the lower, approximately 15 ac (6 ha) of the subject parcel (TMK: 9-6-002:018). Presently the entire parcel is a macadamia nut (*Macadamia integrifolia*) orchard, but with the margins and two narrow windbreak tree lines dominated by other species of trees and herbaceous plants dividing the orchard into northwest-southeast trending units. In addition to the WWTP site, a proposed transmission pipe would be constructed to the northwest through the orchard up to Maile Street. From Maile Street a collection system is planned for many of the streets within Pāhala town (see Figure 1).

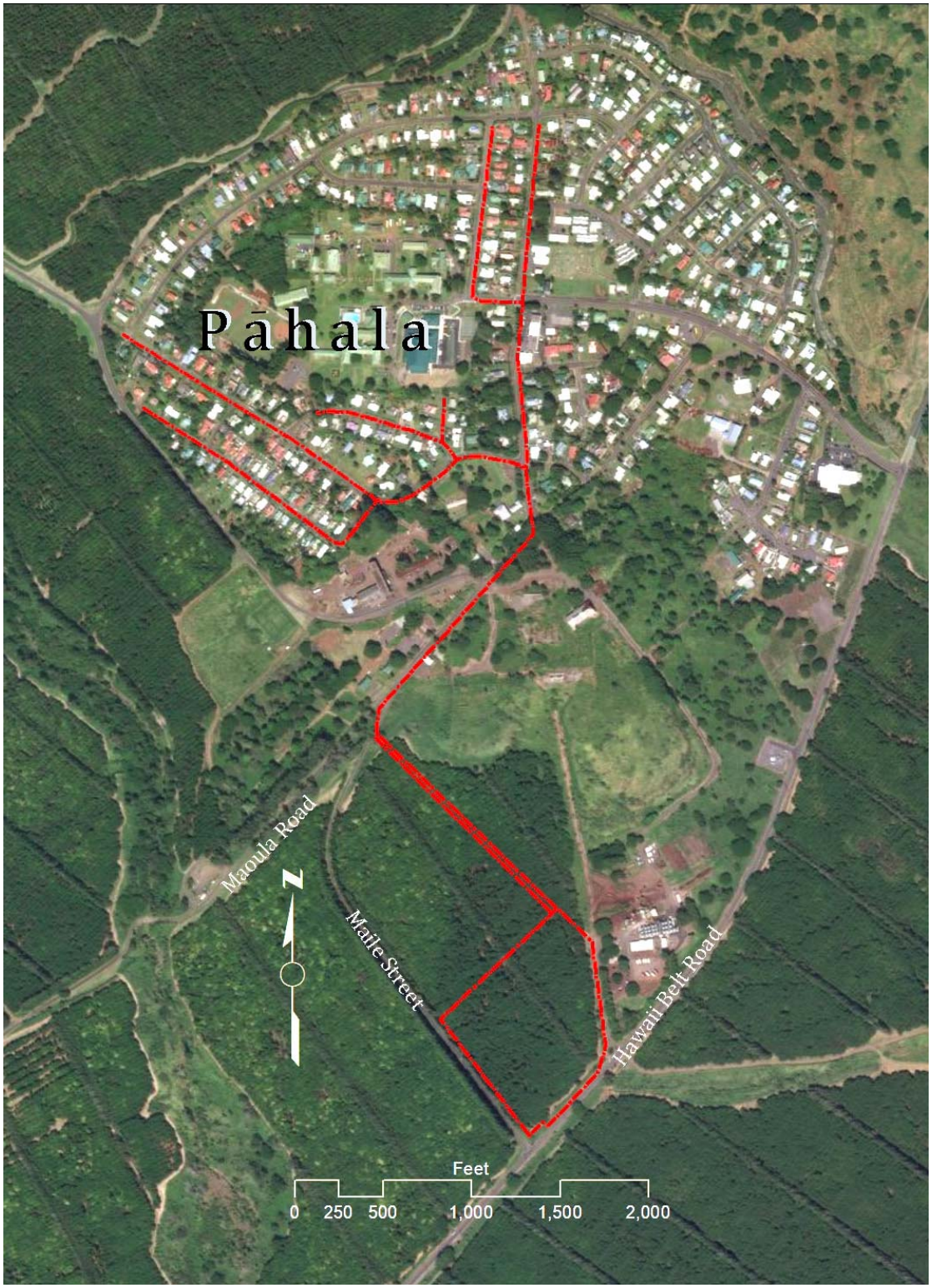


Figure 1. Project and survey areas marked in red, Pāhala.

Macadamia nut trees form a closed crown of dense leaf growth (see cover photo), creating deep shade within most parts of the grove. The dominant understory in these deeply shaded areas is germinating mac nut trees.

Methods

Botanical Survey

The botanical survey was undertaken on August 13, 2018 and entailed a wandering pedestrian transect that traversed the subject property, including the area extending north to Maile Road proposed for installation of a collector main. A "windshield" survey was conducted along all the streets proposed for the collection system beyond the surveyed parcel. Plant species were identified as they were encountered and notations made in a field notebook, which was used to develop qualitative abundance values for each species as the survey progressed. On a strictly area basis, only macadamia nut trees, Guinea grass (*Megathyrsus maximus*), and perhaps a couple of other species would have a ranking above uncommon. So, abundance values in this report are relative to areas that support species other than the macadamia nut trees, such as the road verges and other areas surrounding the orchard, unmaintained areas within the orchard, including narrow windbreak lanes that divide the orchard plots into units. The survey period encompassed the early dry season, but most of the vegetation was in a relatively healthy state (the orchard is irrigated as needed). However, early in the dry season found most trees and shrubs absent fruit or flower. This slight limitation did not compromise the discovery of native species of plants.

Plant names used herein follow *Manual of the Flowering Plants of Hawai'i* (Wagner, Herbst, & Sohmer, 1990; Wagner & Herbst, 1999) for native and naturalized flowering plants, *Hawai'i's Ferns and Fern Allies* (Palmer, 2003) for ferns, and *A Tropical Garden Flora* (Staples & Herbst, 2005) for ornamental and crop plants. More recent name changes for naturalized plant species follow Imada (2012).

Avian Survey

Six avian count stations were sited roughly equidistant from each other, four within the WWTP area and two along the collection pipe route upslope to Maile Street. Stations were sited approximately 150 m (490 ft) apart from each other. A single eight-minute avian point count was made at each of the count stations. Field observations were made with the aid of Leica 8 X 42 binoculars and by

listening for vocalizations. The avian counts were conducted in the early morning hours. Time not spent counting at point-count stations was used to search the site for species and habitats not observed during the point counts. Weather conditions were excellent with winds of between 1 and 5 kph and no precipitation.

The avian phylogenetic order and nomenclature used in this report follows the *AOU Check-List of North American Birds* (American Ornithologists' Union, 1998), and the 42nd through the 59th supplements to the Check-List (American Ornithologists' Union, 1998, 2000; Banks et al., 2002, 2003, 2004, 2005, 2006, 2007, 2008; Chesser et al., 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018).

Mammalian Survey

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) or *ʻōpeʻapeʻa*, all terrestrial mammals currently found on the Island of Hawai'i are alien species, and most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all terrestrial mammalian species detected within the project area.

Results

Vegetation

Vegetation within the areas surveyed comprises a macadamia nut orchard of mature trees, unmaintained areas dominated outside the orchard by Guinea grass, lanes of windbreak trees oriented between orchard units, and (mostly) mowed road verge areas. Within the orchard are scattered small plots of ruderal herbaceous plants, in most cases dominated by nodeweed (*Synedrella nodiflora*), but if generally only lightly shaded, a number of other herbaceous species. The windbreak lanes consist of two rows of trees: silk oak (*Grevelia robusta*) and paperbark (*Melaleuca quinquenervia*) and are used in orchard maintenance to stack cut branches and logs. These lanes support many of the herbaceous plants recorded from the orchard. The proposed sewerage collection system will be installed along already paved roadways within Pāhala. The survey in these areas revealed the vegetation to be entirely maintained yards of ornamental plants.

Flora

A listing of the plant species recorded during the August 2018 survey is provided as Table 1. In all, the listing has 52 species of vascular plants: 2 ferns, one gymnosperm, and 49 species of angiosperms (flowering plants). Only two species (4%) are regarded as native to the Hawaiian Islands and both are indigenous (native, but also distributed elsewhere in the Pacific). Found in low numbers are the ubiquitous, ruderal *ʻuhaloa* (*Waltheria indica*) and the common blue- or purple-flowered morning glory vine: *koali ʻawa* (*Ipomoea indica*). Being widely distributed indigenous species, neither is listed as threatened or endangered or of any special concern.

Table 1. Plant species identified during the August 13, 2018 survey of TMK: 9-6-002:018, Pāhala, Kaʻū District, Hawaiʻi.

Species listed by family	Common name	Status	Abundance	Notes
FERNS				
NEPHROLEPIDACEAE				
Nephrolepis multiflora (Roxb.) F.M. Jarrett ex C.V. Morton	sword fern	Nat	R	
PTERIDACEAE				
Pityrogramma calomelanos (L.) Link	silver fern	Nat	R	<1>
GYMNOSPERMS				
ARAUCARIACEAE				
Araucaria columnaris (G. Forst.) J.D. Hook.	Cook pine	Nat	O	<1>
FLOWERING PLANTS				
DICOTYLEDONS				
AMERANTHACEAE				
Amaranthus spinosus L.	spiny amaranth	Nat	R	
APOCYNACEAE				
Carissa macrocarpa (Ecklon) A. de Cand.	natal plum	Orn	R	
Nerium oleander L.	olreander	Orn	R	
ARALIACEAE				
Schefflera actinophylla (Endl.) Harms	umbrella tree	Nat	U	
ASTERACEAE (COMPOSITAE)				
Ageratum conyzoides L.	*maile hohono*	Nat	R	<1>

Table 1 (continued).

Species listed by family	Common name	Status	Abundance	Notes
ASTERACEAE (cont.)				
Bidens pilosa L.	*ki*; beggartick	Nat	U	<2>
Calyptocarpus vialis Less.	---	Nat	O	<1>
Conyza bonariensis (L.) Cronq.	hairy horseweed	Nat	C	<2>
Crassocephalum crepidioides (Benth.) S. Moore	---	Nat	R	
Cyanthillium cinereum L.	little ironweed	Nat	U	<1>
Lactuca serriola L.	prickly lettuce	Nat	U	<1>
Indet.	ruderal weed	Nat	R	<3>
Synedrella nodiflora (L.) Gaertn.	nodeweed	Nat	AA	<2>
BASELLACEAE				
Anredera cordifolia (Ten.) Steenis	Madeira vine	Nat	R	<3>
BRASSICACEAE				
Lepidium virginicum L.	---	Nat	R	<2>
CAPPARACEAE				
Cleome gynandra L.	wild spider flower	Nat	O	<1>
CONVOLVULACEAE				
Ipomoea indica (J. Burm.) Merr.	*koali ʻawa*	**Ind**	R	
Ipomoea obscura (L.) Ker-Gawl.	---	Nat	O	
Merremia tuberosa (L.) J. Rendle	wood rose	Nat	R	
CUCURBITACEAE				
Momordica charantia L.	wild bitter melon	Nat	O	
EUPHORBIACEAE				
Euphorbia heterophylla L.	*kaliko*	Nat	U	<1>
Euphorbia hirta L.	garden spurge	Nat	O	<2>
Ricinus communis L.	castor bean	Nat	C	<2>
FABACEAE				
Acacia confusa Merr.	Formosan *koa*	Nat	R	
Leucaena leucocephala (Lam.) deWit	*koa haole*	Nat	R	<2>
Macroptilium atropurpureum (DC.) Urb.	---	Nat	U	<1>
Neonotonia wightii (Wight & Arnott) Lackey	glycine vine	Nat	AA	<2>
LAMIACEAE				
Leonotis nepetifolia (L.) R. Br.	lion's ear	Nat	O	<2>
MALVACEAE				
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	Nat	R	
Malvastrum coromandelianum (L.) Garcke	false mallow	Nat	O	<2>
Sida rhombifolia L.	Cuba jute	Nat	C	<2>

Table 1 (continued).

Species listed by family	Common name	Status	Abundance	Notes
MALVACEAE (cont.)				
Sida spinosa L.	prickly sida	Nat	R	
Waltheria indica L.	*'uhaloa*	**Ind**	U	
MORACEAE				
Ficus microcarpa L. f.	Chinese banyan	Nat	R	<2>
MYRTACEAE				
Melaleuca quinquenervia (Cav.) S.T. Blake	paperbark	Nat	C	
Syzygium cumini (L.) Skeels	Java plum	Nat	U	<2>
PHYTOLACCACEAE				
Rivina humilis L.	coral berry	Nat	U	
PROTEACEAE				
Grevillea robusta A. Cunn. ex R. Br.	silk oak	Nat	C	<2>
Macadamia integrifolia Maiden & Berche	macadamia nut	Nat	AA	
RUBIACEAE				
Spermacoce assurgens Ruiz & Pav.	buttonweed	Nat	C	<1>
MONOCOTYLEDONS				
COMMELINACEAE				
Commelina benghalensis L.	hairy *honohono*	Nat	R	<1>
CYPERACEAE				
Cyperus gracilis R. Br.	McCoy grass	Nat	U	
POACEAE				
Axonopus compressus (Swartz) P. Beauv.	brd.-lvd. carpet grass	Nat	C	<1>
Cenchrus purpureus (Schumach.) Morrone	elephant grass	Nat	U	
Chloris barbata (L.) Sw.	swollen fingergrass	Nat	R	
Digiteria sp.	---	Nat	R	
Eleusine indica (L.) Gaertn.	wiregrass	Nat	A	<2>
Megathyrsus maximus Jacq.	Guinea grass	Nat	AA	<2>
Setaria verticillata (L.) P. Beauv.	bristly foxtail	Nat	R	

Legend to Table 1:

Status = distributional status

Ind = indigenous; native to Hawai'i, but not unique to the Hawaiian Islands.

Nat = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778 and well-established outside of cultivation.

Orn = ornamental; crop or landscape plant not established outside of cultivation.

Abundance = occurrence ratings for plants on property in July 2013.

R – Rare - only one or two plants seen.

Table 1 – Legend (continued).

U - Uncommon - several to a dozen plants observed.
O - Occasional - found regularly, but not abundant anywhere.
C - Common - considered an important part of the vegetation and observed numerous times.
A - Abundant - found in large numbers; may be locally dominant.
AA - Abundant - very abundant and dominant; defining vegetation type.

Notes:
<1> Characteristic or found only in the road verge immediately adjacent to the site.
<2> Species also reported from close by in David & Guinther (2013).
<3> Plant lacking flowers or fruit at time of survey; identification uncertain.

Avian Survey

A total of 175 individual birds of 13 species, representing nine separate families, was recorded during station counts (Table 2). Avian diversity and densities were very low, in keeping with the current usage of the site as a mature macadamia nut orchard, with minimal ground cover and few weedy or shrubby species. A closed canopy keeps areas beneath the trees in perpetual twilight. Four species, Northern Cardinal (*Cardinalis cardinalis*), Japanese White-eye (*Zosterops japonicus*), Yellow-fronted Canary (*Ceithagra mozambica*), and Red-billed Leiothrix (*Leiothrix lutea*), accounted for 52% of all birds recorded during station counts. The most frequently recorded species was Northern Cardinal, which accounted for 16% of the total number of individual birds recorded during station point counts. All of the species recorded during the course of this survey are established alien species.

Table 2. Avian species detected during point-counts for the Pāhala Community WWTP Project

Common Name	Scientific Name	**ST**	***RA***
	PHASIANIDAE - Pheasants & Partridges		
	Meleagridinae -Turkeys		
Wild Turkey	*Meleagris gallopavo*	A	2.00
	COLUMBIFORMES		
	COLUMBIDAE - Pigeons & Doves		
Spotted Dove	*Streptopelia chinensis*	A	3.17
Zebra Dove	*Geopelia striata*	A	2.00

Table 2 (continued).

Common Name	Scientific Name	ST	*RA*
	PASSERIFORMES		
	ZOSTEROPIDAE - White-eyes		
Japanese White-eye	*Zosterops japonicus*	A	3.67
	TIMALIIDAE - Babblers		
Chinese Hwamei	*Garrulax canorus*	A	2.00
Red-billed Leiothrix	*Leiothrix lutea*	A	3.33
	STURNIDAE - Starlings		
Common Myna	*Acridotheres tristis*	A	0.17
	FRINGILLIDAE - Fringilline and Carduline Finches & Allies		
	Carduelinae - Carduline Finches and Hawaiian Honeycreepers		
House Finch	*Haemorhous mexicanus*	A	1.33
Yellow-fronted Canary	*Ceithagra mozambica*	A	1.50
	CARDINALIDAE - Cardinals & Allies		
Northern Cardinal	*Cardinalis cardinalis*	A	4.67
	THRAUPIDAE - Tanagers		
	Thraupinae - Core Tanagers		
Yellow-billed Cardinal	*Paroaria capitata*	A	1.50
Saffron Finch	*Sicalis flaveola*	A	1.67
	ESTRILDIDAE - Estrildid Finches		
Scaly-breasted Munia	*Lonchura punctulata*	A	0.17

Key to Table 2

ST Status.

A Alien – Introduced to the Hawaiian Islands by humans.

RA Relative Abundance – Number of birds detected divided by the number of count stations (6).

Mammalian Survey

Rather remarkably, we recorded no mammalian species within the survey area. Indeed, there was no indication that pigs (*Sus scrofa*) utilize the Project area.

Discussion

Botanical Resources

Although some unmaintained or infrequently maintained areas exist on the subject parcel, the entire Project is proposed for land that is highly modified and the flora present subject to alterations, including mowing. Thus, there is no expectation for the site to support remnants of a native forest flora and minimal

opportunity for native plants to become established, the *ʻuhaloa* and *koali ʻawa* being exceptions due to their ability to grow in highly disturbed environments. A previous biological survey (David and Guinther, 2013) conducted on 5 ac (2 ha) of land close by to the east yielded only 25 species of plants, the most abundant being white shrimp plant (*Justicia betonica*), glycine vine, and Guinea grass. Because that area had been highly disturbed, then not disturbed for a long time, species such as the shrimp plant and particularly Guinea grass had become well-established to the exclusion of other species. Sixteen species (24% of the combined species list) were common to both surveys.

Obviously, the macadamia nut orchard is a valuable botanical resource, but a commercial one and not an environmentally sensitive one. The same can be said for the Cook pines (*Araucaria columnaris*) that line Maile Street along the southwestern side of the parcel. These old trees are an important community landscape element to be retained in place by the Project.

Avian Resources

The findings of the avian survey are consistent with the location of the site, and the monoculture of macadamia nut trees present on it. No native avian species were recorded during the course of this survey.

Although not detected during this survey, endemic Hawaiian Petrel (*Pterodroma sandwichensis*) and Newell's Shearwater (*Puffinus newelli*) have been recorded over-flying the general Project area between April and the end of November each year. The petrel is listed as endangered, and the shearwater as threatened under both federal and State of Hawaiʻi endangered species statutes. The primary cause of mortality in both Hawaiian Petrel and Newell's Shearwater is thought to be predation by alien mammalian species at the nesting colonies (USFWS, 1983; Simons and Hodges, 1998; Ainley et al., 2001). Collision with man-made structures is considered to be second-most significant cause of mortality of these seabirds in Hawaiʻi. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds can collide with man-made structures and, if not killed outright, dazed or injured birds become prey to feral mammals (Hadley, 1961; Telfer, 1979; Sincock, 1981; Reed et al., 1985; Telfer et al., 1987; Cooper and Day, 1998; Podolsky et al., 1998; Ainley et al., 2001; Hue et al., 2001; Day et al., 2003). Neither nesting colonies nor appropriate nesting habitat for either of these listed seabird species occur within or close to the current Project site.

Mammalian Resources

No Hawaiian hoary bats were detected during the course of this survey. It is possible that bats use resources within orchard part of the Project. Although, no rodents were recorded during the course of this survey, it is likely that one or more of the four alien Murida*e* established on Hawai'i Island—European house mouse (*Mus musculus domesticus*), roof rat (*Rattus rattus*), brown rat (*Rattus norvegicus*), and black rat (*Rattus exulans hawaiiensis*)—use various resources found within the general Project area on a seasonal basis, especially in the macadamia nut orchard. These human commensal species are drawn to areas of human habitation and activity and all are deleterious to native ecosystems and their dependent native fauna.

Jurisdictional Waters

The subject parcel slopes down to the southwest corner. A street culvert at that location carries runoff in the area under Māmalahoa Highway (Hawaii Belt Road). The National Wetlands Inventory (NWI) Wetlands Mapper (USFW, nd (a)) shows no features occurring on the parcel and no streams are shown on USGS topographic maps (USGS, 1923). Streams in the Pāhala area of the Island do not flow all the way to the sea, but terminate on Keone'ele'ele Flat to the southwest.

Critical Habitat

Federally delineated Critical Habitat is not present in Pāhala area (USFWS, 2012). Thus, the Project will not impinge on federally designated Critical Habitat. No equivalent designation exists under state law

Potential Impacts to Protected Species

No species of plants or animals currently proposed for listing or listed under either the federal or State of Hawai'i endangered species statutes (DLNR 1998, 2015; USFWS, nd (b)) were recorded by this survey. Three faunal species not observed, may occur in the general vicinity and are discussed here.

Seabirds

The principal potential impact that the construction of the project poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the proposed action during the

nesting season. The two activities that could pose a threat to these nocturnally flying seabirds are: a) if during construction, it is deemed expedient or necessary to conduct night-time construction activities during the seabird fledging season (which runs from September 15 through December 15); or b) exterior lighting is installed as part of the WWTP facilities. Impacts can be minimized if all external lighting is made dark sky compliant (HDLNR-DOFAW, 2016).

Hawaiian hoary bat

The potential impact that Project construction poses to the endangered Hawaiian hoary bat would be from clearing and grubbing of the macadamia nut orchard. Trimming or removal of trees within the construction areas may temporarily displace bats using this vegetation for roosting. Hawaiian bats use multiple roosts within their home territories, so the disturbance resulting from removal of trees is likely to be minimal. However, during pupping season, female bats carrying pups may be less able to rapidly vacate a roost site when the tree is felled. Additionally, adult female bats sometimes leave their pups in the roost tree while they themselves forage, and very small pups may be unable to flee a tree that is being felled. Adverse effects from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 m (15 ft), between June 1 and September 15, the bat pupping season.

References

Ainley, D. G, R. Podolsky, L. Deforest, G. Spencer, and N. Nur. 2001. The Status and Population Trends of the Newell's Shearwater on Kaua'i: Insights from Modeling, in: Scott, J. M, S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna. Studies in Avian Biology No. 22*. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas. Pp. 108-123.

American Ornithologist's Union. 1998. *Check-list of North American Birds*. 7th edition. AOU. Washington, D.C. 829 pp.

_____. 2000. Forty-second supplement to the American Ornithologist's Union *Check-list of North American Birds*. *The Auk*, 117: 847-858.

Banks, R. C., C. Cicero, J. L. Dunn, A. W. Kratter, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz. 2002. Forty-third supplement to the American

Ornithologist's Union Check-list of North American Birds. *The Auk,* 119: 897-906.

Banks, R. C., C. Cicero, J. L. Dunn, A. W. Kratter, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz. 2003. Forty-fourth supplement to the American Ornithologist's Union Check-list of North American Birds. *The Auk,* 120: 923-931.

_____, _____, _____, _____, _____, _____, _____, and _____. 2004. Forty-fifth supplement to the American Ornithologist's Union Check-list of North American Birds. *The Auk,* 121: 985-995.

_____, _____, _____, _____, _____, _____, _____, and _____. 2005. Forty-sixth supplement to the American Ornithologist's Union Check-list of North American Birds. *The Auk,* 122: 1026-1031.

_____, _____, _____, _____, _____, _____, _____, and _____. 2006. Forty-seventh supplement to the American Ornithologist's Union Check-list of North American Birds. *The Auk*, 123: 926-936.

_____, R. T. Chesser, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz. 2007 Forty-eighth supplement to the American Ornithologist Union Check-list of North American Birds. *The Auk*, 124: 1109-1115.

_____. _____. _____, _____, _____, _____, _____, _____, _____, _____, and K. Winker. 2008 Forty-ninth supplement to the American Ornithologist Union Check-list of North American Birds. *The Auk*, 125: 758-768.

Chesser, R. T., R. C. Banks, F. K. Barker, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, D. F. Stotz, and K. Winker. 2009. Fiftieth supplement to the American Ornithologist Union, Check-list of North American Birds. *The Auk*, 126: 1-10.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and _____. 2010. Fifty-first supplement to the American Ornithologist Union, Check-list of North American Birds. *The Auk* 127: 726-744.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and _____. 2011. Fifty-second supplement to the American Ornithologist Union, Check-list of North American Birds. *The Auk*, 128: 600-613.

Chesser, R. T., R. C. Banks, F. K. Barker, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, D. F. Stotz, and K. Winker. 2012. Fifty-third supplement to the American Ornithologist Union, Check-list of North American Birds. *The Auk*, 129: 573-588.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and _____.. 2013. Fifty-fourth supplement to the American Ornithologist Union, Check-list of North American Birds. *The Auk*, 130: 558-71.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and _____. 2014. Fifty-fifth supplement to the American Ornithologist Union Check-list of North American Birds. *The Auk, Ornithological Advances*, 131: CSi-CSxv.

_____, _____, _____, _____, _____, _____, _____, A. G. Navarro-Sigüenza, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, D. F. Stotz, and K. Winker. 2015. Fifty-sixth supplement to the American Ornithologist Union Check-list of North American Birds. *The Auk, Ornithological Advances*, 132: 748-764.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and _____. 2016. Fifty-seventh supplement to the American Ornithologist Union Check-list of North American Birds. *The Auk, Ornithological Advances*, 133: 544-560.

_____, K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, D. F. Stotz, and K. Winker. 2017. Fifty-eighth supplement to the American Ornithologist Society Check-list of North American Birds. *The Auk, Ornithological Advances*, 134: 751-773.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, B. M. Winger, and K. Winker. 2018. Fifty-ninth supplement to the American Ornithologist Society's Check-list of North American Birds. *The Auk, Ornithological Advances*, 135: 798-813.

Cooper, B. A. and R. H. Day. 1998. Summer behavior and mortality of Dark-rumped Petrels and Newell's Shearwaters at power lines on Kauai. *Colonial Waterbirds*, 21(1): 11-19.

_____ and R. H. Day. 1998. Summer Behavior and Mortality of Dark-rumped Petrels and Newells' Shearwaters at Power Lines on Kauai. *Colonial Waterbirds*, 21(1): 11-19.

Day, R. H., B. A. Cooper, and T. C. Telfer. 2003. Decline of Townsend's (Newell's Shearwaters (*Puffinus auricularis newelli*) on Kauai, Hawaii. *The Auk,* 120: 669-679.

David, R. E. 2018. Unpublished field notes – Hawaiʻi 1980 – 2018.

_____, and E. B. Guinther. 2013. Biological surveys conducted for the Pāhala Wastewater Treatment Plant Project, Kaʻū District, Island of Hawaiʻi. Prep for Fukunaga and Assoc. Inc. Rana Biological Consulting, Inc., 17 pp.

Hawaiʻi Department of Land and Natural Resources (HDLNR). 1998. Chapter 107. Threatened and Endangered Plants. Department of Land and Natural Resources. State of Hawaiʻi. Administrative Rule under Title 13. Subtitle 5, Part 1, dated March 23, 1998.

_____. 2015. Chapter 124. Indigenous Wildlife, Endangered, Injurious Wildlife, Introduced Wild Birds, and Introduced Wildlife. Department of Land and Natural Resources. State of Hawaii. Administrative Rule under Title 13. Subtitle 5, Part 2, dated February 17, 2015. Exhibits dated November 1, 2014.

Hawaiʻi Department of Land and Natural Resources, Division of Forestry and Wildlife (HDLNR-DOFAW). 2016. Wildlife Lighting. PDF available at URL: http://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf; last accessed on January 17, 2018.

Hadley, T. H. 1961. Shearwater calamity on Kauai. *Elepaio*, 21: 60.

Hue, D., C. Glidden, J. Lippert, L. Schnell, J. MacIvor and J. Meisler. 2001. Habitat Use and Limiting Factors in a Population of Hawaiian Dark-rumped Petrels on Mauna Loa, Hawaiʻi. Pp. 234-242, *in:* : Scott, J. M, S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna*. Studies in Avian Biology No. 22. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas.

Imada, C. T. 2012. Hawaiian Native and Naturalized Vascular Plants Checklist (December 2012 update). *Bishop Museum Tech. Rept*. 60. 380 pp.

Palmer, D. D. 2003. *Hawai`i's Ferns and Fern Allies*. University of Hawaii Press, Honolulu. 324 pp.

Podolsky, R., D. G. Ainley, G. Spencer, L. de Forest, and N. Nur. 1998. Mortality of Newell's Shearwaters Caused by Collisions with Urban Structures on Kaua'i. *Colonial Waterbirds*, 21: 20-34.

Reed, J. R., J. L Sincock, and J. P. Hailman 1985. Light Attraction in Endangered Procellariform Birds: Reduction by Shielding Upward Radiation. *The Auk*, 102: 377-383.

Simons, T. R., and C. N. Hodges. 1998. Dark-rumped Petrel (*Pterodroma phaeopygia*). *In:* A. Poole and F. Gill (editors). The Birds of North America, No. 345. The Academy of Natural Sciences, Philadelphia, PA. and the American Ornithologists Union, Washington, D.C.

Sincock, J. L. 1981. Saving the Newell's Shearwater. Pp. 76-78 in: Proc. of the Hawaii Forestry and Wildllife Conference, 2-4 October 1980. Department of Land and Natural Resources, State of Hawaii, Honolulu.

Staples, G. W. and D. R. Herbst. 2005. *A Tropical Garden Flora. Plants Cultivated in the Hawaiian Islands and other Tropical Places.* Bishop Museum, Honolulu. 908 pp.

Telfer, T. C. 1979. Successful Newell's Shearwater Salvage on Kauai. *'Elepaio*, 39:71

_____, J. L. Sincock, G. V. Byrd, and J. R. Reed. 1987. Attraction of Hawaiian seabirds to lights: conservation efforts and effects of moon phase. *Wildlife Soc. Bull.*, 15: 406-413.

U.S. Fish & Wildlife Service (USFWS). 1983. Hawaiian Dark-Rumped Petrel & Newell's Manx Shearwater Recovery Plan. USFWS, Portland, Oregon. February 1983.

_____. no date (a). National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Available online at URL: http://www.fws.gov/wetlands/ Data/Mapper.html; last accessed on July 1, 2018.

_____. no date (b). USFWS Endangered Species. Available online at URL: https://www.fws.gov/endangered/; Last visited on June 3, 2018 and Environmental Conservation Online System (ECOS), online at URL: https://ecos.fws.gov/ecp/species-reports; last visited on June 21, 2018.

U.S. Geological Survey (USGS). 1923. 15-minute Series, Topographic Map, Pāhala Quadrangle.

Wagner, W. L., D. R. Herbst and S. H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i: Volume I and II*. Bishop Museum Special Publication 83. University of Hawai'i Press. 1853 pp.

_____ and _____. 1999. *Supplement to the Manual of the flowering plants of Hawai'i*, pp. 1855-1918. *In:* Wagner, W. L., D. R. Herbst, and S. H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawaii Press and B.P. Bishop Museum.

THIS PAGE INTENTIONALLY LEFT BLANK